

JOURNAL OF THE



SMPTE

277 Progress Committee Report for 1958 • Lloyd Thompson

Wide-Screen - Optics - Projectors - Animation - Set-Construction Processes
Studio Equipment and Lighting - Special 16mm Equipment - 16/8mm Cameras
and Projectors - Nontheatrical Films - Magnetic Recording Materials
Photo/Magnetic Recording - New Film - Chemistry - Processing Techniques
and Equipment - Medical - Instrumentation and High-Speed Photography
Armed Forces - Video-Tape Recording

TELEVISION: Educational and Closed-Circuit - Color - Closed-Circuit Color
Equipment - Pay - B.B.C. - European

Africa - Australia - Canada - China - Egypt - France - Germany
Great Britain - India - Italy - Japan - Mexico - Poland - Sweden
U.S.S.R. - Venezuela

329 Exchange of Air Defense Information by Closed-Circuit Television

• Hollis Dakin and Paul A. J. Bue

332 An Integrated Sound Service Studio for the 16mm Producer • Robert W. Eberenz

336 A Method of Recording, Editing and Mixing Magnetic Sound for Industrial Films

• D. A. Anderson, R. H. Winter and R. H. Ray

337 Appendix A for Recommended Practice for Reporting Photometric Performance of Incandescent Filament Lighting Units

86th SMPTE Convention • October 5-9 • Statler Hilton, New York

JOURNAL of the SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS

PUBLICATION OFFICE TWENTIETH AND NORTHAMPTON STREETS EASTON, PA.

Officers

President, 1959-60

NORWOOD L. SIMMONS, Eastman Kodak Co., 6706 Santa Monica Blvd., Hollywood 38, Calif.

Executive Vice-President, 1959-60

JOHN W. SERVICES, National Theatre Supply Co., 92 Gold St., New York 38, N.Y.

Past-President, 1959-60

BARTON KREUZER, Astro-Electronic Products Div., Radio Corporation of America, Princeton, N.J.

Engineering Vice-President, 1958-59

AXEL G. JENSEN, Mea Dr., Berkeley Heights, N.J.

Editorial Vice-President, 1959-60

GLENN E. MATTHEWS, Research Labs., Bldg. 59, Kodak Park, Eastman Kodak Co., Rochester 4, N.Y.

Financial Vice-President, 1959

G. CARLETON HUNT, General Film Labs., 1546 N. Argyle Ave., Hollywood 28, Calif.

Convention Vice-President, 1959-60

REID H. RAY, Reid H. Ray Film Industries, 2269 Ford Pkwy., St. Paul 16, Minn.

Sections Vice-President, 1958-59

ETHAN M. STIFLE, Eastman Kodak Co., 342 Madison Ave., New York 17, N.Y.

Secretary, 1959-60

WILTON R. HOLM, E. I. du Pont de Nemours & Co., Parlin, N.J.

Treasurer, 1959

S. P. SOLOW, Consolidated Film Industries, 959 Seward St., Hollywood 38, Calif.

Governors, 1958-59

JOSEPH E. AIKEN, 116 N. Galveston, Arlington, Va.

DON M. ALEXANDER, Alexander Film Co., Colorado Springs, Colo.

HERBERT E. FARMER, 7826 Dumbarton Ave., Los Angeles 45, Calif.

ALAN M. GUNDELFINGER, Technicolor Corp., 6311 Romaine St.,

Hollywood 38, Calif.

W. W. WETZEL, 725 Ridge St., St. Paul, Minn.

DEANE R. WHITE, Photo Products Dept., E. I. du Pont de Nemours & Co., Parlin, N.J.

Governors, 1959-60

GERALD G. GRAHAM, National Film Board of Canada, Box 6100, Montreal 3, Que., Can.

THEODORE B. GRENIER, 2045 DeMille Dr., Hollywood, Calif.

UB IWERKS, 4500 Mary Ellen Ave., Sherman Oaks, Calif.

KENNETH M. MASON, Eastman Kodak Co., Prudential Bldg., Room 2006, Chicago 1, Ill.

ROBERT C. RHEINECK, CBS, 485 Madison Ave., New York 22, N.Y.

JAMES L. WASSELL, 927 Harvard Lane, Wilmette, Ill.

Governors and Section Chairmen, 1959

JEROME C. DIEBOLD, Wilding Picture Productions, 1345 Argyle St., Chicago, Ill.

ROBERT G. HUFFORD, Eastman Kodak Co., 6706 Santa Monica Blvd., Hollywood 38, Calif.

Section Chairmen

R. J. BEAUDRY, Shelly Films Ltd., Toronto, Ont., Canada

B. M. LODEN, Box 37, North Side Branch, Atlanta, Ga.

WILLIAM R. McCOWN, P. O. Box 6215, Nashville, Tenn.

JAMES A. MOSES, 1202 Oberlin Dr., Bucknell Heights, Alexandria, Va.

W. A. PALMER, W. A. Palmer Films, Inc., 1895 Oak Ave., Menlo Park, Calif.

ERWIN J. PATTIST, 3618 Marsh Lane Pl., Dallas, Texas

RICHARD E. PUTMAN, 420 East Corey Rd., Syracuse, N.Y.

EDWARD H. RIDEOUT, Avco R & A D, 750 Commonwealth Ave., Boston, Mass.

Editorial Office

55 West 42d St., New York 36, New York

Editor—VICTOR H. ALLEN

Advertising Manager—DENIS A. COURTNEY

BOARD OF EDITORS

Chairman—PIERRE MERTZ

66 Leamington St., Lido, Long Beach, N.Y.

HARLAN L. BAUMBACH

D. MAX BEARD

GERALD M. BEST

GEORGE R. CRANE

HAROLD E. EDGERTON

CARLOS H. ELMER

CHARLES R. FORDYCE

LLOYD T. GOLDSMITH

LORIN D. GRIGNON

A. M. GUNDELFINGER

CHARLES W. HANDLEY

RUSSELL C. HOLSLAG

EMERSON YORKE

CLYDE R. KEITH

W. I. KISNER

RALPH E. LOVELL

C. DAVID MILLER

HERBERT W. PANGBORN

BERNARD D. PLAKUN

WALDEMAR J. POCH

ALLAN L. SOREM

JOHN H. WADDELL

DEANE R. WHITE

W. T. WINTINGHAM

CHARLES W. WYCKOFF

Papers Committee Chairman—BERNARD D. PLAKUN
63 Bedford Rd., Pleasantville, N.Y.

Subscriptions to nonmembers, \$12.50 a year (outside continental United States, add \$1.00 for postage); subscribers residing in countries which participate in UNESCO may use UNESCO coupons in submitting subscription payments in the event other means of remitting are not available; single copies, \$2.00 for one-part issues, \$2.50 for special two-part issues. A 10% discount is allowed to individual members and accredited agencies on orders for subscriptions and single copies. A list of priced and gratis publications is available. Order from the Society's Headquarters Office, 55 West 42d St., New York 36.

THE SOCIETY is the growth of over forty years of achievement and leadership. Its members are engineers and technicians skilled in every branch of motion-picture film production and use, in television, and in the many related arts and sciences. Through the Society they are able to contribute effectively to the technical advance of their industry. The Society was founded in 1916 as the Society of Motion Picture Engineers and was renamed in 1950.

Membership in Sustaining, Active, Associate or Student grades is open to any interested person according to his qualifications. Information about membership, technical activities and standards and test films for the industry is available from Society Headquarters. Members residing in countries which participate in UNESCO may use UNESCO coupons in submitting membership payments in the event other means of remitting are not available.

SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS

Headquarters Office: 55 West 42d St., New York 36, N.Y.

Cables: Somopict

Telephone: LOngacre 5-0172

Executive Secretary: CHARLES S. STODTER

Published monthly by the Society of Motion Picture and Television Engineers. Publication office 20th and Northampton Sts., Easton, Penna. Second-class mail privileges authorized at Easton, Penna. This publication is authorized to be mailed at the special rates of postage prescribed by Section 132.122. Copyright 1959, by the Society of Motion Picture and Television Engineers, Inc. Permission to republish Journal text material must be obtained in writing from the Society's Headquarters Office, 55 West 42nd St., New York 36. The Society is not responsible for statements of contributors. Printed by Mack Printing Company, Easton, Pa.



Progress Committee Report for 1958

CONTENTS

Introduction	277
Suggestions for 1959 Report	278
Wide-Screen Developments	278
Optics	279
Theater Projectors	280
Animation	281
Materials and Processes for	
Set Construction	282
Studio Equipment and Lighting	282
Special 16mm Equipment	283
16mm and 8mm Cameras	283
16mm and 8mm Projectors	283
Nontheatrical Films	284
Magnetic Recording Materials	286
Photo and Magnetic Recording	286
New Film	287
Chemistry	288
Film Processing Techniques	
and Equipment	289
Medical	292
Instrumentation and High-Speed	
Photography	292
The Armed Forces	293
Video-Tape Recording	294
Television	296

Educational and Closed-Circuit	
TV	296
Color	297
Closed-Circuit Color	297
Equipment	297
Pay Television	297
British Broadcasting Corp.	298
Television in Europe	300
Africa	300
Australia	301
Canada	302
Chinese Peoples Republic	305
Egypt	306
France	306
Germany	307
Great Britain	312
India	314
Italy	315
Japan	316
Mexico	322
Poland	322
Sweden	325
U.S.S.R.	326
Venezuela	326
Conclusion	327
References	328

The Committee

LLOYD THOMPSON, *Chairman*

Jerzy Adamski, Poland	Ahmed Hegab, Egypt
J. E. Aiken	Russell Holslag
R. J. T. Brown, England	Tom Hope
Jose Carlos Carbajal, Mexico	Eric Horvitch, South Africa
Piero Cavazzuti, Italy	Ub Iwerks
Howard A. Chinn	Walter I. Kisner
Stellan Dahlstedt, Sweden	H. N. Kozanowski
Robert R. Davis	Anna Lavorva, U.S.S.R.
L. J. J. Didiee, France	Herbert Meyer
L. G. Dive, England	James C. Morgan, Canada
Richard F. Dubbe	Tom C. Nutt, Canada
George Eaton	B. Olecheycho, U.S.S.R.
Carlos H. Elmer	Hayward C. Parish, Australia
Robert Fehrmann, Germany	J. L. Pettus
M. Fix, Germany	Edw. H. Reichard
K. E. Gondesen, Germany	Rodger J. Ross
Krishna Gopal, India	W. C. Rubinstein
Robt. E. Gottschalk	J. Vicente Scheuren, Venezuela
Robert A. Haines	E. H. Schreiber
M. A. Hankins	Murray H.
John D. Hayes	Stevenson, Australia
	J. M. Unger

Introduction

Technically, nothing of great importance was developed in the motion-picture industry during 1958.¹ Probably the same thing can be said of television.

Surely though, a revolution is still going on in the industry, and this revolution is worldwide. At one time, motion pictures for entertainment used millions of feet of motion-picture film and gave employment to many workers. Today, fewer but more costly entertainment films are being made. Yesterday, nearly all entertainment films were made by large studios. Today, more than half of

the films are "B" pictures and many are being made by independent producers.

But, today, films for many purposes other than entertainment are sought by the large film users and afford a source of employment. These include TV films, business films, educational films, propaganda films, government films, and films used in evaluating such things as missile work and space exploration. There are many others. A great deal of this new-era film making can be credited to the introduction of the 16mm home movie camera only 30 years ago.² There are indications in several places that 8mm is now entering such an era.

This revolution is not only evident in the United States, but in many countries covered by this report.

New uses are being found for video-tape recording. In some places it is

replacing film photography but as new uses are found faults are also being found which indicates that there is room for both video-tape recording and film photography.^{3,4}

For many years a great deal of the producing equipment was made in the United States. Much of it is still made here, but the other countries are producing increasing amounts, and some countries that once purchased equipment from the United States are gradually turning to other sources for their supplies. Better prices, newer design and good service are reasons given for this shift.

It would appear that the motion-picture worker need not worry about his job disappearing. He may be making propaganda films instead of entertainment, but the future of motion-picture photography in some form looks bright.

Submitted March 16 to April 9, 1959, by Lloyd Thompson, Committee Chairman, c/o The Calvin Company, 1105 Truman Rd., Kansas City 6, Mo. The Committee makes an annual report, this report covering the calendar year 1958.



Fig. 1. Underwater housing for Cinemiracle camera used in filming *Windjammer*; housing designed by Fenjohn, Inc., Ardmore, Pa.

Suggestions for 1959 Report

We feel that the present committee is working smoother than in the past. We have only two suggestions this year:

- (1) Keep up the good work.
- (2) We would like to add other countries to the report. If your country is not represented and you would like to make the report, write to either:

The Editor, Society of Motion Picture and Television Engineers, 55 West 42 St., New York 36, N. Y.; or preferably to

Mr. Lloyd Thompson, Progress Committee Chairman, c/o The Calvin Company, 1105 Truman Road, Kansas City 6, Mo.

Wide-Screen Developments

A three-camera, three-projector wide-screen system called Cinemiracle was introduced with the film *Windjammer* which was shown simultaneously in New York and Hollywood on April 9, 1958. Developed by National Theatres, experimental footage was shown at a demonstration in New York, November 26, 1957. (This demonstration was described in the Progress Committee Report for 1957).⁵ The process employs mirrors to combine three films into one screen image. The three-camera unit, mounted on a single base, was designed by Mitchell Camera Co. Electronic remote control lenses, manufactured by Smith-Deitrich Corp. of Philadelphia are used on the three cameras to achieve perfect synchronization in photographing one scene on three strips of 35mm film.⁶ The system utilizes a special Eastman film with square sprocket holes to assure precision. The seven-track high-fidelity stereophonic sound is an RCA develop-

ment. A special camera housing was designed to enclose the Cinemiracle camera for underwater cinematography. Camera and housing together are said to weigh 1600 lb on land and only 80 lb, when pressurized, underwater. The housing was designed so that it could be guided "free" by skin divers or made stationary on a submarine (Fig. 1).

Cinerama announced plans for several new features and a \$12 million loan was obtained from Prudential Life for expanding production, and for improvement of the process. It was rumored that the improvement would be a single-film, single-lens system.⁷

There was a good demand for Technicolor's Technirama process, and more producers used the process.⁸

Twentieth Century-Fox restored the emphasis on stereophonic sound to go with CinemaScope pictures and also announced an improved method of doing the original recording.⁹ More theaters were equipped to show CinemaScope; and pictures shot in other wide-screen processes, in many cases, were available as CinemaScope release prints.

The third Todd-AO production, *South Pacific*,¹⁰ was shown in the United States and England and at Brussels. The Todd-AO system photographs on 65mm and projects a 70mm print carrying six magnetic tracks. *South Pacific* made use of a new concept in color photography. Color filters, used in bad weather to brighten "sunlit" scenes, were also used for "mood purposes" for emotional effect.¹⁰ In Great Britain, Philips Multipurpose 70/35mm projectors were installed at the Dominion in London and the Gaumont in Manchester because of their "remarkable versatility." Other equipment installed especially for Todd-

AO included G.B-Kalee sound and Mole-Richardson 490 high-power arc lamps.¹¹

Panavision 70 is identical to the M-G-M Camera 65 process, and incorporates not only the lenses and cameras for the photography, but the optical printing lenses, projection lenses, and other equipment. In cooperation with M-G-M Studios, Panavision Inc. designed and manufactured the equipment, made available to the entire industry.

Raintree County, the first picture to be photographed in the process, was released only in 35mm CinemaScope which was extracted from the 65mm negative by means of a Panavision optical printing lens. *Ben Hur*, currently in production, will be released in the full 70mm version.

The Panavision 70 negative contains enough information to project an image with an aspect ratio of 3 to 1, the largest of any commercial system in use. Three-strip Cinerama prints have been successfully extracted to allow Cinerama-type productions to be filmed with a single Panavision camera. Interpanel movement is practically eliminated due to the single negative.

Panavision's spherical 65mm process is similar to Panavision 70 except that spherical lenses are used instead of anamorphic. This process produces an aspect ratio of 2.25 to 1 with 4-channel sound and an aspect ratio of 2 to 1 with 6-channel sound. The system is currently in use on Rowland V. Lee's production of *The Big Fisherman*.

Technicolor's Technirama 70, first used on Walt Disney's *Sleeping Beauty*, is achieved by enlarging and de-anamorphosing the Technirama negative by the use of a special Panavision optical printing system installed on a Technicolor optical printer.

This method of achieving a standard 70mm release print from the Technirama negative is mainly suitable for cartoon films inasmuch as the original negative is photographed on three separate black-and-white films instead of color negative, thereby avoiding degradation of quality.

Pictures continued to be made in the VistaVision process.

A wide-screen system which uses a single standard camera and one projector to photograph and project a picture having a scope of 180° was demonstrated by the inventors, Rowe E. Carney, Jr., and Tom Smith, of Rolla, Mo., in December 1958. A special lens attachment which fastens to the front of the camera breaks up the scene being photographed into three separate pictures, two of 45° and one of 90°, all within a standard frame or aperture (Figs. 2-4). The screen used for the demonstration is 74 ft wide, 16 ft high, with a 180° curvature (Fig. 5). In the demonstration 35mm film was used, but the attachments can be designed for film of any



Fig. 2. Frames of the Smith-Carney system.

width, the inventors reported. Motivation for designing the one-projector system was to bring big-screen pictures to small communities.¹²

A 16mm color film, *The U.S.A. in Circarama*, was shown at the Brussels World's Fair in April. Circarama, called "movies in the round," is a Walt Disney development which projects a picture on a 360° screen to provide a panoramic view for an audience in the center of a circular auditorium. The system employs eleven cameras and eleven projectors.¹³ Circarama is also cited under "Nontheatrical Films" in this report.

The revised edition of *Wide-Screen Motion Pictures* was published by the Society. The 16-page booklet contains up-to-date descriptive and technical information on wide-screen processes. Specifications are given for each system.

Optics

The application of new design techniques together with the use of new optical materials has led to the introduction of a series of 35mm camera lenses by Taylor, Taylor & Hobson. These lenses, the Cooke Speed Panchro Series II, range from an 18mm $f/1.7$ to a 22-in. $f/5.6$ (Fig. 6). Seven basic lens designs have been utilized in the 12 lenses of this series, which are reported to possess improved definition and uniform image illumination.¹⁴

Taylor, Taylor & Hobson also introduced a zoom lens, the Studio Varotal, for studio and industrial use. Interchangeable lens units are provided so that the lens may be used with both image orthicon and vidicon cameras.

Five Panavision Auto Panatar Lenses (Fig. 7) for the 35mm professional camera were introduced. These lenses are available in 40mm, 50mm, 75mm, 100mm and 150mm focal lengths, and fit such cameras as the Mitchell BNC and Mitchell NC without alteration. It is said that these anamorphic lenses have superior resolution and noteworthy lack of distortion. The Panavision series of lenses has been extended to include a lens of great speed, the Ultra-Speed Auto Panatar, 50mm $f/1.0$ lens.

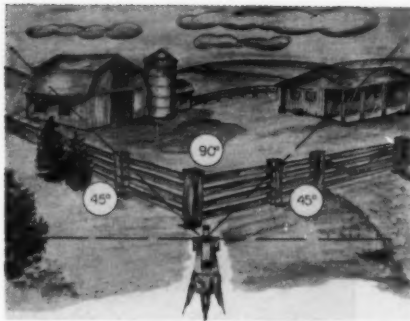


Fig. 3. Smith-Carney lens-attachment division of 180° picture into three parts.

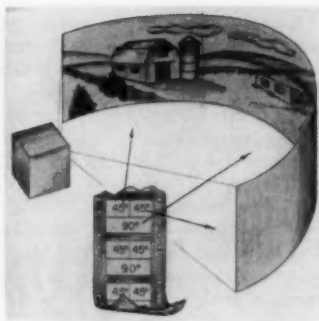


Fig. 4. Projection scheme of Smith-Carney picture.



Fig. 5. Curved screen used in Smith-Carney single-camera, single-projector system.



Fig. 6. The 75mm Series II Cooke Speed Panchro Lens, $f/2(T2.3)$; left, optical unit; center, in Newall Mount; right, in Arriflex Mount.

Eight new lenses for the 16mm professional camera are available from Taylor, Taylor & Hobson. These lenses range from a 12.5mm $f/1.8$ to 150mm $f/3.8$, and a 9mm $f/1.85$ lens is expected in the near future. These lenses, named Kinetel, represent a considerable amount of critical and exhaustive research. All

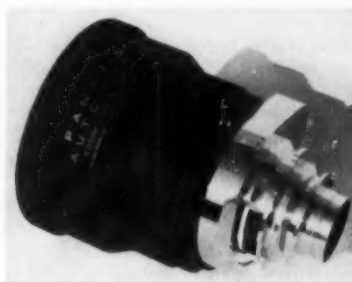


Fig. 7. Panavision Auto-Panatar.

focal lengths have been designed to take fullest advantage of the available rare-earth glasses with resultant superb color correction.¹⁵

A new lens has been announced by Kling Photo for use with the Arriflex 16mm and 35mm cameras, to permit continuous focusing from infinity to 4 in. This new lens, the 40mm $f/2.8$ Kilfitt Makro Kilar A, weighs 6 oz, has f -stops from $f/2.8$ to $f/22$ that may be preset to permit focusing with wide-open lens, and instant change to the selected f -stop for shooting.¹⁶

A new periscope attachment which permits "around the corner" photography with any "C" mount or GSAP-type 16mm camera is available from Traid Corp. Named the Fotoperiscope, this attachment rotates a full 360° and may be locked in place at any angle by a knurled ring.¹⁷

A new 5.7mm *f*/1.8 Kinoptic lens has been announced by Karl Heitz. This new lens completes a series of 12 color-matched lenses for 16mm cameras ranging in focal length from 5.7mm to 500mm.¹⁸ Century Precision Photo Equipment introduced a 300mm *f*/4.5 telephoto for 16mm "C" mount cameras. This lens, which weighs 24 oz, is said to possess high apochromatic resolving power.¹⁹

Elgeet announced a fully automatic lens to fit 8mm D-mount cameras. The Synchronex-8 is a 13mm *f*/1.8 lens internally linked to a photocell. The lens also has manual setting scale from *f*/1.8 to *f*/16.²⁰ Also announced by Elgeet were four new Opto-Navitar 8mm camera lenses; a 6.5mm, 8.5mm and two 38mm *f*/1.8 lenses.²¹

A 145mm *f*/4.5 Tele-Cinor lens for the Camex Reflex 8 single-lens reflex camera has been introduced as "the longest telephoto lens available to the 8mm motion-picture fan." This lens, distributed by Karl Heitz, focuses from 10 ft to infinity and covers an angle of view of 3°. ²²

Bausch & Lomb described the newly developed vidicon-type camera lenses ranging from 15mm *f*/2.5 to 100mm *f*/3.5. These lenses are reported optically and mechanically designed to provide a high degree of illumination and exceptional performance over the vidicon receptor area.²³ Taylor, Taylor & Hobson also introduced lenses for vidicon cameras. The Cooke series, named Vidital, comprises four lenses: 20mm *f*/1.7; 30mm, 50mm and 80mm *f*/1.4. These lenses are reported to have excellent television performance characteristics.²⁴

A further development of the Studio Zoomar lens was announced. This Studio Zoomar is a 6-lb lens with a 55mm to 180mm zoom range and a speed of *f*/2.7.²⁵ Also introduced by Zoomar Corp. was the ITV Zoomar Mark II for industrial TV cameras. The 2½-lb unit has three built-in motors and a standard "C" mount. The lens has a full zoom range of 6:1 and features two focal-length ranges, 22 to 130mm and 35 to 210mm with a speed of *f*/3.5.²⁶

Asahi Optical introduced two new telephoto lenses, a 300mm *f*/4 unit focusable from 25 ft. to infinity and a 1000-mm *f*/8 lens focusable from 100 ft to infinity. Both lenses are of rugged lightweight construction.²⁷

New lightweight mounts have been designed for the Canon 28mm *f*/3.5 and 35mm *f*/2.8 lenses. The mounts

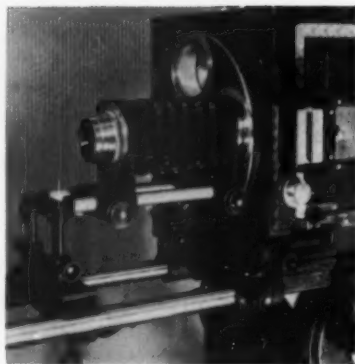


Fig. 8. Varifocal close-up attachment for Mitchell cameras.

permit the use of the same 40mm attachments for 25mm, 28mm, and 35mm lenses.²⁸

An Edmund Scientific Camera Holder makes it possible to attach a 35mm camera to a reflecting or refracting telescope. The set includes a bracket which attaches permanently to the telescope and a removable rod holding another adjustable bracket for mounting the camera by means of the tripod thread hole.²⁹

A Kinoptik cradle-support for long-focus motion-picture camera lenses was announced by Karl Heitz. The cradle is threaded to fit any standard tripod or dolly. It will support lenses from 100mm to 500mm in focal length.³⁰

An especially designed varifocal close-up unit (Fig. 8) for Mitchell cameras was introduced. The unit contains its own lens and is said to eliminate the setup time previously required when extension tubes were used. Its deep-drawn extension bellows permits infinite focus and affords a wide range of photography.³¹

New interference filters for the infrared spectral region from 1000 to 2000 μ have been announced by Fish-Schurman. Available in two types, Infrared Band Filters and Infrared Precision Band Filters, they are cemented to a suitable colored-glass filter for absorbing transmission peaks of higher order.³²

The Eugen Bauer GmbH firm of Stuttgart has announced production of a new cold-light mirror for use in its Kino-Bauer projector. A distinguishing characteristic of this new reflector is its surface coating on the arc side.³³ The lamp of the new Strong Jetarc Projector employs a 21-in. mirror with a 6¼-in. focal length and 42-in. working distance. This new lamp uses the "blown arc" invented by Gretener of Switzerland.³⁴

A newly designed Oxberry optical printer incorporates a number of noteworthy features including automatic follow focus, automatic dissolve, interchangeable film transport mechanisms, precise tilting mechanism, higher efficiency lens and illumination system.³⁵

The Trickoma II is a versatile optical

printer for making copies from either 35mm or 16mm to 16mm or 35mm. Optical magnification can be varied from 1:3 to 1:0.33, the image being automatically focused at all magnifications.³⁶

J. W. Fecker has designed a tracking telescope which can cover the aperture of a full-frame 70mm motion-picture camera. The main optical system is an 18-in. clear aperture catadioptric telescope with variable focal length from 90 to 500 in.³⁷

A low-cost TV viewfinder using a 1-in. vidicon was described by Karl Freund of Photo Research Corp. The camera, measuring 2½ in. square and 7½ in. in length, reproduces 600 lines of definition at 10 ft-c. The system is said to be economically priced and achieves the purpose of enabling a motion-picture director to see the picture he is directing on a TV monitor.³⁸

An exposure time of 0.01 μ sec is reported achieved with a Kerr cell electro-optical shutter and pulse generator circuit developed by Avco Manufacturing Corp. especially for ballistics photography. The shutter has found application in aerodynamic simulation studies of long-range missile re-entry problems.³⁹

A light chopper which can produce pulses of light only a few billionths of a second in duration has been developed by Westinghouse. The device is also used to produce ultrafast pulses of infrared and ultraviolet radiation.⁴⁰

A new antiscratch lens cleaner, Edwal Protective Lens cleaner, which cleans both coated and noncoated lenses without excessive rubbing has been announced by Edwal Scientific Products Corp.⁴¹

Theater Projectors

Westrex Corp. introduced a new series of high-power transmission units for its drive-in theater systems and as replacement units in existing installations where greater undistorted power is wanted. These transmission units are manufactured in sizes from 400 w for drive-in theaters with up to 800-car capacity to 1200 w for a 2400-car drive-in theater. The design objectives were compactness, reduction in installation time and expense, and accessibility of all components to simplify servicing. The 400-w transmission equipment unit is for drive-in theaters with a capacity of up to 800 cars. Two of the new Westrex 28-type 200-w amplifiers, each with independent power supply, regular and emergency exciter lamp rectifiers and an emergency switching and monitor horn panel, are combined in a single cabinet, 5 ft 6 in. high. The Westrex 28-type main amplifier has a continuous power output rating of 200 w with a harmonic distortion of less than 1% over a frequency range of from 20 c to 20,000 c and a peak power rating of 400 w with not more than 1% harmonic distortion.



Fig. 9. Technirama successive-frame negative, copyright 1959, Walt Disney Productions.

The frequency response of this amplifier is flat within 0.25 db over the entire operating range. The amplifier has an adequate gain to work directly from the fader into the ramp distribution panel to deliver 400 w output power with an input level of -20 dbm.

The output damping factor of the push-pull triode output has a minimum ratio of greater than 12 to 1 with the result that the impedance of the in-car speaker circuits is not critical. A meter is provided on each amplifier for output tube monitoring.

The output voltage of 57.5, 70.7 (normal), 115, or 141.4 v may be selected. Low impedance outputs of 4, 8, and 16 ohms unbalanced to ground can also be supplied. The 28-type amplifier can be operated from either 50 or 60-c sources of power.

Although two 28-type amplifiers are normally employed in this 400-w transmission unit, one amplifier can supply sufficient output power to operate 800 in-car speakers on an emergency basis. This feature eliminates the necessity of providing emergency standby power amplifiers and consequently results in a material reduction in cost.

The transmission units are also made with continuous output ratings of power capacity contained in three small rack cabinets which occupy a floor space of less than eight square feet.

Cinematograph International, Inc., New York, was appointed U.S. distributor of 70-35mm projectors manufactured by Cinemeccanica di Milan, Italy.⁴²

Century Projector Corp. announced a new projector mechanism.⁴³ Century also announced the first U.S.-made 70-35mm projector.⁴⁴

The Strong Jetarc Projection Lamp was announced by the Strong Electric Co. of Toledo, Ohio. This is a reflector-type projector lamp employing the blown arc invented by Dr. Edgar Gretenner. This provides a means of burning a high-brightness carbon at an extremely high-current density while realizing a high-collection efficiency. The lamp employs a 21-in. glass cold mirror with a 6½-in. focal length and 42-in. working distance. It was described at the Society's Convention in Los Angeles.⁴⁵

The Philips SPP Gas Discharge Lamp was introduced by Philips-of-the-Nether-

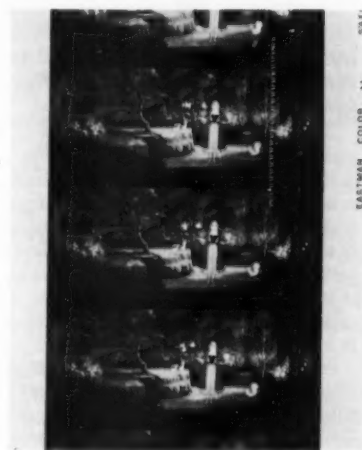


Fig. 10. Technirama 70 print in Walt Disney Production, *Sleeping Beauty*.

lands at the Photokina Exposition in Cologne, Germany, Sept. 27-Oct. 5. This light source, which has been described as "revolutionary," is a quartz tube 80mm long with a maximum diameter of 5.6 mm. It operates with a pulsating direct current at 72 impulses/sec, and does not require a rotary shutter. It is used with a specially designed projector, the Philips FP 20-S. The frame of the projector is a steel housing pressed as a single unit of rectangular cross section. It incorporates the curved running plate used in an earlier projector, the DP70.⁴⁶

Animation

The use of animation in television and nontheatrical areas has increased markedly in recent years. While a great variety of animation equipment has become available⁴⁷ as the field expanded, only a limited number of developments appeared within the past year.

Disney developed a special adaptation of the Technicolor Technirama Process⁴⁸ for producing their new cartoon feature *The Sleeping Beauty*. An anamorphic camera lens of 1.5 to 1 constant compression ratio was designed. Exceptional definition was obtained by use of the successive-frame method of color separation negatives (Fig. 9). For large-screen presentation Technicolor produced de-anamorphosed prints on 70mm film

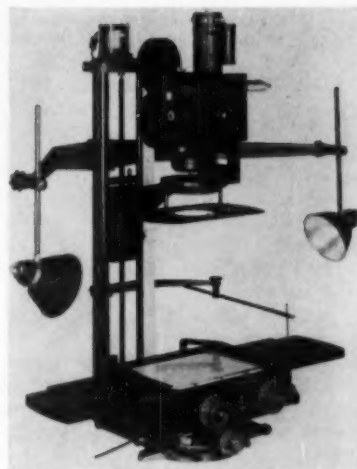


Fig. 11. Bowlds table-model animation stand.

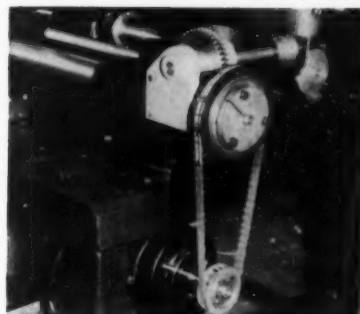


Fig. 12. Electronic zoom attachment for Tel-Animastand.

(Fig. 10) with multitrack sound while general release prints were made in 35mm size for the usual wide-screen anamorphic projection.

Disney and others have adapted the Haloid Xerox method of copying as a means of transferring animation drawings direct from paper to cels thus eliminating the usual inking process. Xerography is a dry, electrical process of photography which normally produces a positive from a positive.⁴⁹

The Bowlds Engineering Co. of Los Angeles developed a low-priced lightweight table-model animation stand (Fig. 11). Of precision construction, the stand is capable of handling a great variety of animation, special effects, titles and other requirements. Two models are supplied: the Custom, designed for filmstrips and conventional animation; and the Deluxe, a machine with facilities for all types of animation.

S.O.S. Cinema Supply Corp. has introduced a new electronic zoom (Fig. 12) as an accessory to their Tel-Animastand animation stand. The device allows zooms to be made electrically, replacing the older hand-operated method.

A new Oxberry animation stand designed for industrial use was introduced by Animation Equipment Corp. at the Society's 1958 Spring Convention in Los Angeles. The stand can accommodate standard 16mm and 35mm camera and stop-motion motors. The platen is hand-operated and spring-loaded. A 9 by 12-in. removable section in the table top provides clear space to the floor or underneath lighting. Cel tables measuring 12 by 22 in. are built in on the left and right sides of the compound.⁵⁰

A titling, animation and special-effects camera stand and compound table were introduced by Warren Conrad Portman Co. The compound has ball-bearing mounted 19 by 26-in. east-west movements which ride on 2-in. ground-steel rails.⁵¹

An animation process that uses electronics to create motion and color from a single piece of black-and-white artwork was demonstrated by Colortech Films of New York.⁵²

Materials and Processes for Set Construction

A Symposium on the use of plastics in motion-picture and television set construction was presented jointly by SMPTE and the Society of Plastics Engineers during the SMPTE Spring Convention in Los Angeles.⁵³

Subjects discussed were: Fundamentals and Scope of Set Construction; Plastic Materials for Casting and Hand Lay-up Applications; Mold Materials; Heat Formable Plastic Sheets; Foamed Plastics; Ornamental and Functional Coatings; and Plastisols, Plasticizers, Films and Adhesives. Among noteworthy new materials introduced to the studios, the following may be briefly mentioned:

Low-molecular polyethylene,⁵⁴ a thermoplastic material, was found to be most effective for casting or slush-molding solid or hollow props. Similar in appearance and chemically related to paraffinic waxes, it is substantially superior in mechanical strength and flex behavior.

Polyethylene sheets have found increased use as low-cost, inert plastic materials for covering and protecting equipment and stocks. Water impermeability, chemical resistance, and excellent low-temperature flex are outstanding properties. A new product, glass-fiber-reinforced polyethylene sheet,⁵⁵ is a laminate combining a core of glass-fiber reinforcing which contributes a high degree of dimensional stability, break, tear, and burst strength. It localizes tears and rips which can easily be repaired by small patches so that the sheets can be used over and over again. Such sheets are available in sizes up to 6 ft by 100 ft.

Large lightweight panels, partly in replacement of heavy, plywood-surfaced flats, are finding acceptance in the



Fig. 13. Mole-Richardson Type 176 Portable Lighting Power Supply Transformer.

studios. Prominent among these is a multi-ply paper laminate⁵⁶ and a paper-surfaced veneer-type material.⁵⁷ An important innovation is the heat-sealing of thin, abrasion-resistant films to board surfaces to improve resistance to marring, staining and warping. A film product of exceptional merit for this purpose is a polyester type material.⁵⁸

New sizing agents for scenic backings were introduced. These are formulated with high-molecular polyethylene glycols⁵⁹ and are superior to earlier starch-type formulations.

Polyurethane foam plastics, long contemplated as materials for prop and set fabrication, have, so far, not been readily used, due to high material cost, health hazards, and complexity of processing techniques. New products⁶⁰ in which Freon-type liquids are used to initiate the foaming action, promise to alleviate substantially some of the major drawbacks of earlier materials.

Spotting mixtures for wardrobe cleaning were found to be rendered vastly more effective for the removal of difficult cosmetic stains through addition of small amounts of new cationic surface active agents of imidazoline structure.⁶¹

Studio Equipment and Lighting

Mole-Richardson Co. (Hollywood) has developed a portable Type 176 Transformer (Fig. 13) for supplying 120-v a-c lighting power at locations where power of sufficient capacity normally exists in higher voltages only. The transformer may be connected to either a 240-v or 480-v 3-phase a-c, 60-c power source, and will provide 255 amp of incandescent lighting load at 120 v. To compensate for variations from the nominal value of primary power supply voltage, a tap changer switch permits adjustment of load voltage to desired value as indicated on panel voltmeter. Stage pockets and bus bars are provided for load connections.

Mole-Richardson (England) Ltd. has developed a new Type 20,000 incandescent 20-kw spotlight, known as the Con-

quest, intended for studio use where a powerful key light is required in an all-incandescent set. The unit is so arranged that the whole inside mechanism can be retracted for bulb renewal and cleaning. A time counter is incorporated to log bulb hours and an automatic run-up device reduces starting surge in power supply. The beam from its 24-in. diameter lens may be adjusted through a range of 24° to 68°.

As a result of TV studio lighting requirements, Mole-Richardson (England) Ltd. has developed a new line of incandescent spotlights of 500-w, 2000-w and 5000-w capacity. They are spherical in general shape, have built-in barn-doors, and utilize a new optical system giving beam divergencies up to 70° or measured to 10% of center intensity. For remote operation, panning, tilting, focusing and barn-door, adjustment is achieved from the floor by the operator using a long pole with a clip-on attachment at one end. In addition, pole operation parts are available for use with existing equipment.

Century Lighting, Inc., and Station WPST-TV in Miami, Fla., designed and installed a flexible lighting grid to reduce time and effort needed for relocation of lighting units on TV stages. The system uses two sets of rails, with one set suspended by double roller carriers from the other set. Lighting units are suspended by single carriers from either the stationary or movable rails. Each carrier has an automatic brake to maintain position. A pole is used to release the brake and position the lights and movable rails. This equipment and installation were described at the Society's 1958 Spring Convention.⁶²

The Superior Electric Co. has developed an Infinite Preset System Controller for use with Luxtrol Magnetic Amplifier Dimmers in stage lighting. A preset card having bronze staples placed at predetermined points determines the voltage output from the various dimmer circuits. The staples, one for each dimmer to be used, are placed on the preset card, in accordance with calibrated scales having graduations matching those of the individual controllers used for predetermining the desired preset settings. When the preset card is inserted in the Preset System Controller each staple forms an electrical contact between a potentiometer-connected resistance strip for its respective dimmer control circuit and a fixed contact strip.

Two Luxtrol Infinite Preset System Controllers are required for operation with all desired features. Preset Card No. 1 is inserted in Controller A and the controller energized. Preset Card No. 2 is then inserted in Controller B, and on cue this can be energized either by gradual fading (at a speed determined by the operator's movement of the fader lever) or by instantaneous switching.

With Controller B now energized, Preset Card No. 3 is inserted in Controller A and again on cue, either gradual or instantaneous, control is switched back to Controller A. This procedure may be followed for an infinite number of presets.

A preset reloading system installed at the CBS Television City, Hollywood, was described at the Society's 1958 Spring Convention.⁶³ It was installed by Fischback & Moore, Inc., with Century Lighting, Inc., equipment.

A dimming unit using a silicon-controlled rectifier was produced by Century Lighting Co.⁶⁴ A silicon unit, manufactured by General Electric Co., was announced by Kliegl Bros.⁶⁵

Two new lighting units were announced by General Electric Co. (England), a 2-kw spotlight weighing 27 lb and a 5-kw spotlight weighing 60 lb. The spotlights, which have a specially designed cooling system, are for use with Osram 2-kw and Osram 5-kw lamps.⁶⁶

Special 16mm Equipment

John A. Maurer, head of JM Developments, Inc., New York, has continued to develop the VDL (Variable Density Linear) 16mm photographic sound-on-film system which is offered as a regular film recorder, or incorporated in a film printer built for the purpose of transferring picture and sound from magnetic-stripped originals to 16mm all-photographic release prints. The machine is now in operation in a prominent New York laboratory.⁶⁷ Heart of the VDL system is a new type of galvanometer which employs a mask with controlled nonlinearity to compensate for the nonlinear characteristics of the film in use.⁶⁸ With this system, excellent variable-density tracks may be made using positive release print stock. The system was described in a paper delivered before the SMPTE in October, 1957.⁶⁹

The principle of the movie camera and the tape recorder were combined by Berndt-Bach, Inc., in a visual-audio-electronic recorder called Datasync.⁷⁰

A transistorized 16mm TV remote film camera was described by Edward W. Tink of WLAC-TV of Nashville, Tenn.⁷¹

Debie announced a 16mm projector attachment which could be fitted to a 35mm projector for showing 16mm sound film.⁷²

16mm and 8mm Cameras

During 1958 the use of automatic iris systems increased in the United States as well as other countries; and 8mm equipment seems to have definitely established itself for amateur and home movie-making, while 16mm, now well established in research and science, has replaced 35mm in many professional and commercial uses.

Most of the new 8mm cameras introduced were Electric-Eye models:

Bell & Howell and Revere came up with new models of their automatic exposure cameras which were introduced last year. Bell & Howell's new line (Fig. 14) dispensed with the one manual adjustment previously necessary on other electric-eye models — setting the camera for indoor or outdoor color film. This was done by placing a yellow filter behind the electric-eye grid that compensates for the different color of sun and artificial light.

The automatic iris control incorporated in the Bell & Howell Design 290 8mm camera was described in a paper presented at the Society's Spring Convention in Los Angeles.⁷³ The iris control is operated by the power from a photovoltaic cell. This is feasible because of the low power requirements of a rotary "barn-door" iris.

Revere's new models feature the "optic-scale," a viewfinder device.⁷⁴

Wollensak, DeJur, Ansco and Keystone all introduced 8mm automatic iris setting cameras. The Wollensak Eye-Matic features an automatic backlight exposure compensator. The DeJur Electra has a contoured "handi-grip" for one-hand operation.

Agfa introduced its Movematic 8mm camera which has a fully automatic coupled diaphragm with photocell control.⁷⁵

Paillard Inc., introduced the first photoelectric 8mm camera to measure only the light going through the lens: the Bolex B-8L, 20-20 computational. This permits the use of interchangeable lenses, all types and speeds of film, and all variable shutter openings. A double indicator system is used.⁷⁶

The Bauer organization has two new models, the 88ES and the 88DS. Both have an exposure meter coupled to the lens iris and both have provision for simultaneous filming and sound recording.⁷⁵

The Eastman Kodak Brownie "Scopa Sight" movie cameras have a built-in light meter coupled to the optical viewfinder and lens diaphragm.⁷⁷

The Nizo Heliometric Trifo 8mm camera with coupled photocell exposure regulation has a vertically sliding three-lens turret.⁷⁸

New Keystone and Bell & Howell cameras have clip-on exposure meters which give direct readings in *f*-numbers.⁷⁸

Several nonexposure meter cameras of interesting design also made their debut. The Gevaert Double and Cine Camera has a natural grip "pistol trigger" with the spring motor in the handle. Turning the handle winds the motor.⁷⁹

A trigger-grip handle which fits Filmo 70 series cameras and is also available for the 240TA was announced by National Cine Equipment Inc.⁸⁰

The Junior Tripod was announced by S.O.S. Cinema Supply Corp. Designed



Fig. 14. Bell & Howell 390TA 8mm electric eye camera.

for 16mm cameras, it was grooved legs for rigidity, frontal star knob threading and curved aluminum support locks.

An intervalometer for use with the Arriflex-16 camera in making time-lapse pictures was announced by Kling Photo Corp. Three models provide intervals from 6 sec to 20 min; 12 sec to 50 min; and 2 min to 10 hr.⁸¹

The Bolexy 8 is reputed to be the worlds smallest 8mm movie camera. It uses 25-ft lengths of preslip film in a compact magazine and incorporates a variable shutter. Measurements are $3\frac{1}{8}$ by $1\frac{1}{8}$ in.⁸²

The Arco Pro 8mm camera has features found in the 16mm professional camera: variable shutter, through-the-lens focusing, and bright optics finder.

The Rexer Sports Electric 8mm designed especially for sports use, features variable spreads and rewind with power supplied by a motor using two $1\frac{1}{2}$ -v C batteries.⁸³

The Bolex H-16mm camera is a single-lens version of the Bolex H-16 system and features a "preview finder" for instant parallax correction and rapid focal-length adjustment.⁸⁴

16mm and 8mm Projectors

A trend toward automation was also noticed in 8mm projection equipment.

An automatic-threading movie projector, the Auto Load, was introduced by Bell & Howell. Threading consists of feeding the film into a threading channel and hooking it on the take-up reel after it has been threaded automatically. Other features are a loop setter and a Filmovara zoom projection lens.⁸⁵

The Baskon 8mm projector has no sprockets, and no loops, and threading is accomplished merely by slipping the film into the gate.⁸⁶ Both the Baskon and the new Argus 8mm projector use the Sylvania Tru-Flector lamp.

Eastman Kodak's new 750-w Showtime 8 projector features a shutter which transmits up to 60% more light. Included with the unit is a new Press Tape dry splicer.⁸⁷

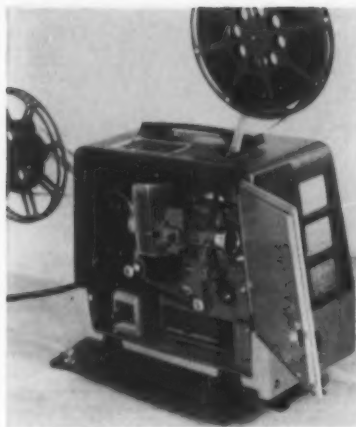


Fig. 15. Bell & Howell 398A Filmosound Specialist projector for nontheatrical use.

The Bauer T-10 compatible sound or silent 8mm projector has electronic synchronization controls which allow sound or silent operation at will. The unit synchronizes with any tape recorder, and uses a point source 12-v, 100-w lamp.

Bell & Howell introduced two new models of the Filmosound 16mm projector, the 384A and the 398A (Fig. 15) Specialist. The new Specialist is designed for simplified use in schools, churches and industry, and has polished-sapphire inserts on shuttle, guide rail and tension clips.

A Norwegian company introduced the H.H.K. 16 Optical-Magnetic 16mm sound projector in which provision is made for a wide variety of recording and reproducing functions, including transferring sound from optical to magnetic track.⁷⁵

Nontheatrical Films

There has been so much confusion about such terms as "educational films," "nontheatrical films," "industrial films," etc., that it may be helpful to designate the specific areas of the motion-picture industry to which they apply. Types of motion pictures are divided, according to use, into four major categories: Theatrical; Nontheatrical; Television; and Amateur. Under "Nontheatrical" there are five main categories (plus a sixth which cuts across other of the main categories): (1) Business and Industry (all sponsored films); (2) Government (Federal, state and local); (3) Education (public, private university, commercial educational producers); (4) Religious; and (5) Civic, social welfare, recreational (organizations). As the possible sixth category, Medical represents films produced by business firms, government agencies, educational institutions and medical organizations.

In 1958, the number of films produced in the United States increased slightly

Table I. Number of Films by Categories.

Business and Industrial.	4500
Government (Fed., state and local)	1500
Educational	500
Religious	200
Civic, Social Welfare, Recreational, etc.	200
Medical	300
Experimental and Avante Garde	100
TOTAL	7300

(300) over the 1957 total. The increase was mainly in educational films and was due to the special series produced for school use (see Table I).

The Encyclopaedia Britannica Yearbook of 1959 estimated that in 1958 2800 hours of nontheatrical films and 500 hours of theatrical films were produced. Laboratories report that during the depth of the recession, the number of titles did not decrease and even increased slightly, but the number of prints per job dropped decidedly for business and industrial films.

Canadian film production, reported last year for 1957, showed annual figures of: 773 motion pictures, 506 filmstrips and 2153 television filmed commercials. This total of 3432 exceeds the 3044 books and pamphlets published during the same period in Canada.⁸⁸

In dollar volume, 1958 remained just about even with 1957, dropping off only two million. The factors used in determining the totals given in Table II are (1) motion-picture production, (2) release prints, (3) distribution costs, (4) equipment purchases (primarily 16mm sound projectors), and (5) other audio-visual materials and equipment (including filmstrip projectors and filmstrips, 2 by 2 slides used professionally, overhead transparencies, opaque projectors, etc.). Tape recorders and record players are not included.

The growing stature of the nontheatrical film continued to climb as the 1958 Brussels World Fair made extensive use of motion pictures from many of the nations and organizations exhibiting. Most spectacular was the eleven-projector unit (Fig. 16) in the United States pavilion which showed one movie in a 360° circle screen. Circarama featured scenes of American cities, factories, farms and well-known landmarks. Success of Circarama at Brussels has prompted the U.S. Information Agency to schedule it at the Casablanca International Fair and the American National Exhibition in Moscow, both during 1959.

Also noteworthy as indicative of the growing stature of the medium was the use of 16mm projectors in the U.S. pavilion in 34 locations, running short loops on Americana. Altogether, 54 Eastman Pageant projectors were kept running in these rear-screen locations continuously for 13 hours a day during the Fair.

Table II. Nontheatrical Films Dollar Volumes.

	1958	1957
Business and Industry	\$149,000,000	\$156,000,000
Government		
(all)	48,000,000	49,000,000
Education	27,000,000	25,000,000
Religious	15,000,000	13,900,000
Civic, Soc. Wel., Recreational, etc.	8,500,000	7,510,000
Medical and Miscellaneous	7,500,000	5,700,000
TOTAL	\$255,000,000	\$257,110,000

Last year CINE (Committee on International Non-Theatrical Events) acted for the first time as a coordinating agency for U.S. nontheatrical films centered in two foreign film festivals — Edinburgh and Venice. In the previous year, upwards of 100 motion pictures from this field in the U.S. were sent to each festival, with only a few being shown. In 1958, this situation was greatly improved: Edinburgh — 24 submitted, 13 screened; Venice — 27 submitted, 25 screened. CINE is made up of representatives of film users and sponsors from the six categories of the nontheatrical film field (except U.S. Government films which are selected separately by a Government committee). With foreign film festivals taking on new importance as a showcase for world public opinion, governments from many parts of the globe have placed greater emphasis on films for festivals.⁸⁹

Another voluntary operation within the educational film area is AVCOPI (Audio-Visual Council on Public Information). Its purpose is to promote wider and better use of audio-visual materials in schools. Functioning for three years, AVCOPI has established some standards and published a number of items, all on a voluntary basis. AVCOPI went on record that a school system should spend \$1.00 per pupil per year as a minimum for audio-visual materials.⁹⁰

Much of AVCOPI's work in 1958 was devoted to the National Defense Education Act of 1958.

In addition to providing fellowships and student loans, this legislation is aimed primarily at stepping up the quality and quantity of science, mathematics and modern foreign language instruction. Motion pictures, television and other audio-visual techniques will play major roles as equipment and films can be purchased with States providing matching funds with Federal funds. A small but important section (Title VII) of the Act encourages research of new and different educational media uses.

The trend of producing a complete curriculum on film continued as Encyclopaedia Britannica Films received a

second Ford Foundation grant for 163 chemistry films (half-hour each) which were made at the University of Florida. Coronet began production of a series on teacher training and Massachusetts Institute of Technology worked on 70 films on physics.

Southern Illinois University began a saturation experiment whereby 61 films were used in ten high-school classes for a semester to attempt to teach a year of history in half a year. The results of this test are not yet available.

The Iowa State Department of Public Instruction reported the following equipment statistics as of 1957 for its school systems:

99% have motion-picture projectors;
93% have record players;
92% have filmstrip and slide projectors;
90% have radio receivers;
57% have tape recorders;
12% have opaque projectors;
3% have overhead projectors.

At that time there were 261 TV sets, mainly within range of the educational TV station, WOI-TV.⁹¹

Although the current ratio of projectors to schools nationally is approximately one per school, colleges have an average of six each, high schools two each, and elementary schools almost one machine per school (Table III).

Table III. Total of Projectors vs. Total of Schools.

Type of School	Pro- jectors	No. Schools
Public Elementary	100,200	110,875
Public Secondary	52,000	25,627
College and Univ.	12,000	1,863
Private Elem. and Sec.	13,000	15,652
	177,200	154,017

The figures in Table III do not indicate the saturation in the many school systems, especially in smaller cities and towns. See Table IV for examples.

Table IV. Examples of Well-Equipped School Systems.

	Projectors	Schools
Dearborn, Mich.	98	30
Penn Yan, N. Y.	11	5
Endwell, N. Y.	19	5
Horseheads, N. Y.	21	14

A trend in the newer schools and better-equipped older schools is to have at least one projector per floor. There is a direct correlation between the convenience of equipment for the teacher and good utilization of film materials. Schools which have student audio-visual corps to relieve the teachers from the physical handling of projectors (i.e., securing, setting up, threading, operating, and returning equipment) have the best records for use of films.

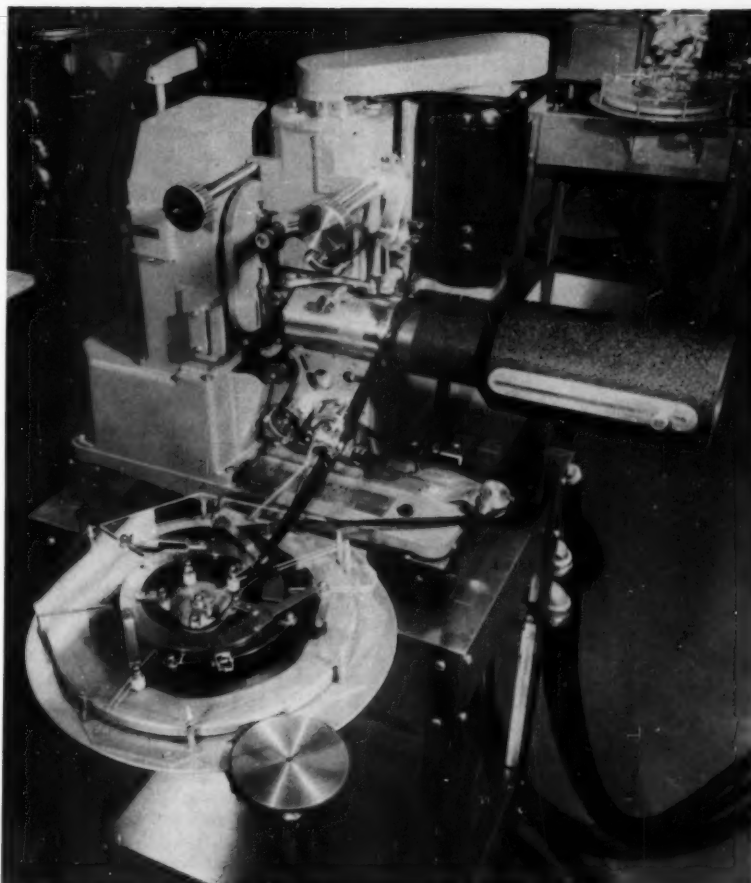


Fig. 16. One of eleven Eastman Model 25B 16mm projectors adapted for Circarama with 360° projection screen for the U.S. pavilion at the Brussels World Fair. In the foreground is the continuous loop magazine arrangement which with a special selsyn motor permitted projecting the 18-min Walt Disney film 24 times each day.

Still another development in education which has been expanding for the past ten years is the rise of campus film-production units, similar to the growth of university presses. Some 80 colleges and universities across the country are now turning out types of films, which for one reason or another (often economic) are not feasible for commercial educational film producers. Not only are these universities showing real talent as film producers (turning out 3000 titles to date), they are beginning to train the film-makers of tomorrow in a field which has been neglected. The national interest in teaching points up the need for more emphasis on the communication arts and motion-picture courses.

As the use of motion pictures in schools, churches, industry and organizations has become routine, film libraries have been opened to meet the demand for films. A survey from the U.S. Office of Education indicates the following growth of 16mm film libraries in the U.S., 1948-1956:

Year	No. of Libraries
1948	576
1949	897
1951	2,002
1953	2,660
1956	3,300
1958	3,660

These libraries include those in schools, public libraries, audio-visual dealers, commercial film distributors, business firms, churches, and others. The current number of libraries is probably closer to 4000 since a number have restricted collections and do not wish to be listed in the government bulletin.

Public Library film activity continued to grow as 32,443,000 persons (in a population of 46,959,323) attended showings of their films in 1957. This is an 18% increase over 1956 when 27,590,679 persons viewed library films within a 40-million population area. The 66 libraries having basic film collections spent \$311,011.00 for prints in 1957. This does not include the prints purchased for 16 regional circuits involving

214 other libraries. The Rochester, N.Y., Public Library is reported to have the largest public library collection in the country — 2367 titles.

Business film circulation figures rose. Ford Motor films were seen in 1958 by an estimated 30 million persons (not including free TV audiences); General Motors had an audience of 17 million; General Mills and Wilson Sporting Goods had 11 million watching their sports rule films at a cost of \$2.00 per thousand which compares favorably with the mass media. American Can's *Alaska's Silver Millions*, a motion picture on salmon fishing, has run up an audience total of over 25 million, rivaling a good Hollywood "A" picture.

American Telephone and Telegraph Co. has distributed 4500 prints of its excellent sponsored educational film, *Adventure of Telesonia*. This film package (including movie, teachers guide, student literature, filmstrip and actual telephone sets) has become a basic part of the curriculum in many schools. Over 15 million school children have benefited from this program. *Mr. Bell*, in ten years, has been seen by over 35 million persons.

In the business field, a strong trend has become apparent toward low-cost, "in-plant" movies.⁹³ Today, with simple 16mm cameras and high-speed film (allowing movies to be taken in existing light with no artificial illumination) the art of film-making has been extended to many subjects such as work simplification, engineering, time and motion studies, etc.

Marathon Paper, using Rudy Swanson Productions, have been taking candid movies with a hidden camera for a number of years. Women are photographed in supermarkets as they make selections from a group of competitive products, testing the selling appeal of various package designs. Selected scenes are then incorporated into motion pictures for sales training programs and for conventions.

For the first time, the World Medical Association held an International Film Exhibition as part of its annual meeting in Edinburgh, Scotland. The event, organized by the American Medical Association and Johnson & Johnson, was so successful that it will be repeated at the 1959 convention in Canada. Sixty per cent of the films screened in Edinburgh were produced by U.S. doctors, schools and companies.

Nontheatrical films are a very important factor in educational television which is included elsewhere in this Report.

Magnetic Recording Materials

There is very little to report on new magnetic recording materials. Some of the "bugs" in the manufacture of video tape have been ironed out and Minne-

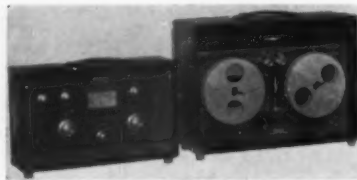


Fig. 17. Westrex RA-1592 Mixer and RA-1591 Recorder.

sota Mining and Mfg. Co. reports that the company's "179" video tape is now good for about 200 passes. The firm also reports fewer dropouts and smoother surfaces. A new tape, described as "sandwich" instrumentation tape, has a protective coating over the oxide layer.

Orradio Industries, Inc., of Opelika, Ala., makers of Irish tape, opened a new plant.⁹³

A precision-made "Scotch" brand reel for magnetic tape used in critical instrumentation recording applications was announced by Minnesota Mining and Mfg. Co.⁹⁴ The company also announced a splicing tape for video tape.⁹⁵

A new line of RCA magnetic tapes was announced. The tapes, made in thicknesses of $\frac{1}{8}$, 1 or $1\frac{1}{2}$ mils, use either acetate or Mylar as a base for oxide coating impregnated with dimethyl silicone.⁹⁶

"Satellite" tape, thus designated because it was developed especially to record data from the IGY earth satellite launched by the Naval Research Laboratory's Vanguard rocket, was announced by Minnesota Mining and Mfg. Co. Each tape supplied for satellites is $\frac{1}{2}$ in. wide and 2500 ft long. It is used to record seven data channels at tape speeds of 30 in./sec on instrumentation-type magnetic recorders. The satellite tape was also used to record signals from U.S. Army satellites and Russian Sputniks.⁹⁷

In France, Pyral began manufacturing perforated $\frac{1}{4}$ -in. tape with 8mm or 16mm perforations.⁹⁸

An interesting article on the manufacture of tape was published in *Business Week*.⁹⁹

Photo and Magnetic Recording

A new recording system for $\frac{1}{4}$ -in. PerfoTape, 16mm or $17\frac{1}{2}$ mm film, designed by Westrex Corp., consists of an RA-1591-type Recorder and an RA-1592-type Mixer, each in a lightweight, portable, plastic surfaced fabric covered plywood case (Fig. 17). The small size and weight has been achieved with no significant loss of quality as compared to larger equipment for the same recording media.

The bias oscillator and the monitor amplifier are completely transistorized. The microphone preamplifiers and recording amplifiers, however, use vacuum tubes which were found to give better signal-to-noise and distortion

characteristics than transistors under conditions of a wide range of input signal levels. The power transformer and shielding in the mixer have been designed so that no increase in noise is produced by the square-wave power derived from an inverter operating on d-c input power.¹⁰⁰

A simple method of 16mm magnetic-stripe sound-film production has been described.¹⁰¹ It uses the double-film system with its advantages of editing freedom. The camera and a magnetic-optical sound-recording projector are interlocked by operating both units with selsyn or synchronous motors. For additional economy, the recording projector may be held in synchronism with the camera by means of a mechanical brake and a stroboscopic disk. For re-recording of the final print, two projectors are locked together by a toothed timing belt and sprockets. The addition of sprockets to the projectors, for belting to another projector or to a drive motor, is a simple external operation.

The late Edward P. Kennedy described a method of providing interlock between perforated picture film and nonperforated $\frac{1}{4}$ -in. magnetic tape. The camera a-c power source and the sound program are recorded simultaneously on two separate tracks on the tape. The power source recording is equivalent to sprocket holes on the film when suitable reproducing equipment is provided. The speed of the tape during reproduction is controlled in the normal manner by the quality of the transport system, but the speed of the film projector (or the sound re-recorder) is controlled by the power source track on the tape through a magnetic amplifier for studio use, or a thyatron amplifier for portable use.¹⁰²

The Siemens & Halske dual-strip 16/16 projector with synchronous motor has particular application in the production of industrial films and TV commercials.¹⁰³

John B. McCullough and Joseph E. Aiken discussed the work of the pioneer in motion-picture sound recording, Professor Joseph T. Tykociner, now over 90 years old, and how in 1922 he held one of the first public demonstrations of a sound-on-film talking motion picture.¹⁰⁴

Considerations for obtaining the best possible quality in magnetic recording included citing several possible sources of trouble in recording equipment, but particular emphasis was laid on variations in the recording media, such as bias requirements, frequency response, distortion and overload characteristics and signal-to-noise ratio. Adjustment of the equipment to suit the medium in use was outlined.¹⁰⁵

Malcolm G. Townsley discussed the status of international standardization of magnetic sound on film. Work had been proceeding since 1950 on the

national level, and since 1955 on the international level by the International Standards Organization (ISO). Proposed standards are now in circulation for ISO ballot. The mechanical standards involving stripe and track location were easily settled, but agreement on the picture-to-sound synchronization distance for 16mm films was difficult because of previous well-established national standards. The proposed frequency-response standards are defined in terms of the relative normal surface induction to be recorded on a film from a constant voltage input to the recorder. The shape of the curve is in terms of the admittance of a series combination of a resistor and a capacitor. A film recorded thus is specified to reproduce flat with a reproducer in proper adjustment. For 35mm film, the time constant of the resistor and capacitor is 35 μ sec and for 16mm film is 100 μ sec. American industry and some others strongly desired inclusion of a de-emphasis curve on the 16mm film standard. This was satisfied in the shape of the tolerance curves which bracket the ideal nominal curves as described above. Two remaining problems are: first, more experience with 16mm magnetic sound on film to determine the wisdom of choice of the 100- μ sec time constant; and second, more experience in the measurement of absolute surface induction.¹⁰⁸

Heads of sound departments in the motion-picture studios of Hollywood reported a quiet year with little that was new in methods or equipment. Stereophonic sound, except for roadshow-type releases, seemed dead. The cause seemed to be an unwillingness on the part of the exhibitors to spend extra money on sound in which the public showed no interest. Twentieth Century-Fox, however, with all its pictures in CinemaScope, continued to record music and dialog in three-track stereo, and made optical and mag/optical prints available for release.

A portable magnetic film recording system was announced by Hallen Electronics Co. It is known as Model 1216.¹⁰⁷

A magnetic film recorder/reproducer designed especially for master recording and re-recording in the field or studio was announced by Stancil-Hoffman Corp.¹⁰⁸

A variable-area or density photographic recording system with optional magnetic recording facilities was described by Westrex Corp.¹⁰⁹

The Rap-Edit Sync Point Shifter Magnetic Recorder was announced by D'Arcy Magnetic Products, Ogden Dunes, Gary, Ind. The recorder is expected to be especially useful to producers of TV newsreels, educational and documentary films. It will also record 200-mil standard magnetic track and 50-mil displaced stereo magnetic track.¹¹⁰

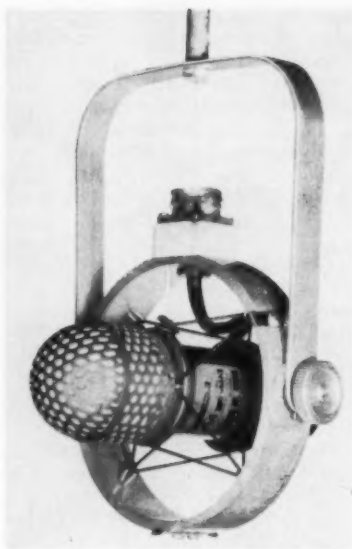


Fig. 18. RCA Electrostatic uniangular microphone without wind screen.

An electrostatic uniangular microphone (Fig. 18) was added to the RCA motion-picture sound-recording product line in 1958.¹¹¹ The unit, inclusive of wind screen and connecting plug, weighs slightly over one pound and exhibits a much higher sensitivity (10 db) than any microphone previously used for motion-picture sound recording. It has a low internal noise level and uses an instantly removable wind screen. The directional response approaches that of a cardoid, but is slightly narrower. A small power supply was developed along with the microphone so that it can be used where 115 v a-c is available. A matching network is also available for connecting the cathode follower output of the microphone to a preamplifier input.

Also introduced in 1958 was a dual magnetic sound film reproducing mechanism housed in a single rack (Fig. 19) and capable of simultaneous operation of both its units. The reduction in size follows the familiar trend of minimization of equipment components throughout the industry. In this case the 100% space requirement reduction is accompanied by a simplification of operating technique, in that a technician may remain posed in one place for operation of both units, the equipment also contains the new magnetic heads which do not require an external shield box and which contain a separate, rotatable film-supporting shoe.

New Film

Early in 1958 Ansco introduced Super Anscochrome Tungsten Film, Type 226.¹¹² This is a 16mm color reversal camera film, having an exposure index of 100 and balanced for use with tungsten sources having a color temperature of

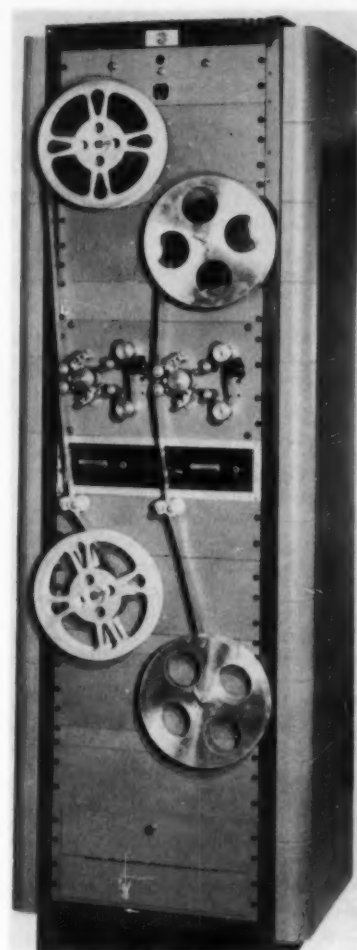


Fig. 19. RCA dual magnetic reproducer.

3200 K. The film is also available in 35mm width as Type 526.

Eastman Kodak introduced¹¹³ a new 16mm reversal color camera film designed to replace Kodachrome Commercial Film. This new material, designated as Ektachrome Commercial Film, Type 7255, is balanced for 3200 K tungsten illumination but can be used under daylight conditions with a Kodak Wratten Filter No. 85. The exposure index values are 25 and 16 for tungsten and daylight, respectively. The film is intended as a camera original only, its contrast and color balance being suited for making prints directly onto Eastman Reversal Color Print Film, Type 5269 or by first making an internegative on Eastman Color Internegative Film, Type 5270 or Type 7270 and subsequently printing onto Color Print Film, Type 5382 or Type 7382. Ektachrome Commercial Film differs from Kodachrome Commercial Film in that the color couplers are incorporated in the emulsion layers, thus simplifying the processing thereof. Processing service is

provided by several Kodak Laboratories but the film may also be processed by the user if desired. The equipment and techniques for processing of this film were described at the 1958 Spring Convention of the Society.¹¹⁴

Eastman Fine Grain Panchromatic Duplicating Negative Film, Types 5234 (35mm) and 7234 (16mm) was also introduced during 1958. The new material provides lower granularity and improved definition compared to that obtained with earlier materials.

Du Pont introduced a new Superior 2 film, the Type 936 Fine Grain Superior 2 film. Of considerably finer grain than its predecessor and superhardened to withstand elevated processing temperatures, Type 936 is an all-purpose, medium-speed negative stock for both exterior and interior motion-picture production. It develops to normal density and contrast two to three minutes faster than the old, discontinued Superior 2. Exposure indexes (for use with ASA-calibrated exposure meters) for Type 936 are 80 for daylight and 64 for tungsten. The new film is available in 16mm and 35mm daylight-loading and lab-pack rolls, footage numbered.¹¹⁵

The Gevaert Company of America announced several new films for different applications. A 16mm reversal duplicating material known as Duplicating Reversal Film, Type 891 was designed to give a D-log E curve having an extended straight-line portion. An improved black-and-white camera negative film in 35mm and 16mm widths, specified as Gevapan 30, Type 165 replaces the former Gevapan 30, Type 164 film. The new film is said to have improved granularity, definition and spectral sensitivity characteristics with somewhat greater development rate than that of the Type 164. Two new color materials have been announced but are not yet available in the United States. One of these is Gevacolor Negative Film, Type 653 (35mm) which represents improvements in granularity and in the color couplers compared to the earlier Type 652 material of the same name. The second is Gevacolor Positive Film, Type 953, supplied in both 35mm and 16mm widths. This film has a black antihalation layer which is removable in a prebath. The image sharpness and color tone reproduction characteristics are said to be superior to the earlier Type 952 product.

Celanese Corporation of America began the manufacture of triacetate film to supply independent organizations that coat film.¹¹⁶

Chemistry

The motion-picture film-processing laboratories have established high standards for processing long lengths of film. Exposure control and film processing are closely interdependent accord-

ing to the sensitometric standards and image quality required by each studio. Basically the processing must be controlled to provide uniform image quality from frame-to-frame and archival keeping properties, especially from master negatives. To accomplish these and other aims necessarily complex processing systems have been designed requiring large machines operated at high speeds, extensive chemical process control, and highly trained technicians.

Similar problems exist in other fields involving the exposure of film in motion-picture cameras or other devices utilizing continuous lengths of film, for example, amateur cinematography and micro-filming. In each case quite complex continuous processing systems have been devised. The processing of roll and sheet films is also accomplished in relatively complex systems.

During recent years there has been a definite trend toward automatic processing in more compact equipment using simplified chemistry in order to reduce the time required to process the film and at the same time reduce the extensive process control necessary. In many scientific, industrial and engineering applications it is important to view the photographic image as soon as possible after exposure. However, optimum image quality is not always of primary importance and operations such as complete fixation and washing can often be omitted, and accomplished later if required. It is not unreasonable to predict that future refinements of new rapid processes may very well produce optimum image quality and, therefore, provide simplified processing of motion-picture film.

Several rapid processing techniques described in the last two or three years indicate the trend discussed above. Exceptionally high film-processing rates have been obtained by using spray-processing techniques and conventional solutions at elevated temperatures, but the equipment is large, complex, and too costly except for applications utilizing large volumes of film. There are now available a variety of units for quality work capable of speeds from 25 to 150 ft/min, some having dry-to-dry cycles of less than 5 min.

However, it is desirable in many instances to have compact, semiportable machines for processing 16, 35 and 70mm black-and-white films in 100- or 200-ft lengths. Small electrically driven, water-powered or hand-operated, rewind devices have been used to process rolls of film but they require considerable time and are not equipped for film drying. The Fairchild Minirapid Processor, introduced late in 1957, is a table-top unit that processes rolls of 16mm film, dry-to-dry, at 5 ft/min using a hot-air impingement dryer built into the processor. Solution temperatures ranging

from 85 to 140 F are used, depending upon the film employed.

16mm and 35mm films are being more extensively used in the recording of cathode-ray-tube images and in radar recording. In these applications immediate availability of the image is a necessity and image quality is of secondary importance. Special thin-coated hard emulsions are used ordinarily to permit very rapid processing. Kelvin Hughes, Ltd., in England, introduced a compact unit that exposes, processes and projects an image automatically in 5 sec. A number of devices have been described that process these films within 0.2 to 20 sec utilizing either a combined developer-fixer solution (monobath) or two-stage processing, whichever best fits the specific system. In these cases the film travel rate is not very great, ranging from a fraction of an inch per minute to several feet per minute but the image must be available immediately after exposure.

Immediate image access is also important at high film speeds in excess of 100 ft/min for some recording applications. A 35mm airborne processor, a product of Fairchild Camera Co., processes 1000 ft of film at rates up to 120 ft/min, using the highly viscous single-stage Fairchild Thixotropic solution which is forced under pressure through an opening the width of 35mm film. The solution is picked up by the film from the microscopic undercut face of the applicator block and then covered by a clear plastic film making a sandwich as it passes through a set of pressure rollers. The processor is attached to a motion-picture camera and the processed film can be projected. The sandwich can be separated subsequently and processing completed if required.

The immediate appearance of an image or record in reflecting mirror galvanometer oscillographs has been accomplished, processing recording paper emulsions at 125 ft/min. In the Consolidated Electrodynamics Corporation Datrite Processor a developer is applied through a 2- or 4-mil slit to 12-in. wide paper with development and drying accomplished by passing the treated paper over a heated platen. The elapsed time from exposure to the dry record is 0.8 sec at 125 ft/min.

Medical x-ray sheet films can be processed without hangers on the Kodak X-Omat M-2 Processor, dry-to-dry, within 6 min compared to conventional mechanical systems that require an hour or longer. A unique wringer-roller design is used in both the wet section and the air impingement dryer. Litho-type sheet films can be processed automatically in the Haloid Lithoflo Processor.

It is evident that considerable progress has been made in the simplification of both machine design and chemistry to

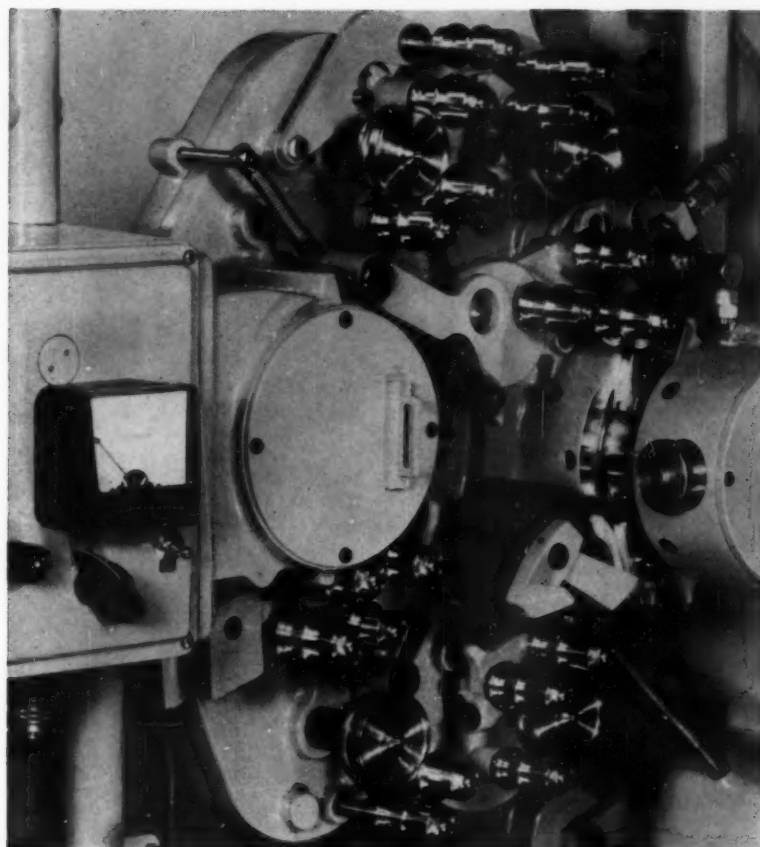


Fig. 20. 16mm Bell & Howell automatic color printer with soundhead, radio-frequency patch cuing device, edge number printer, air pressure for aperture cleaning and roller gates.

provide the photographic image in much shorter processing times. Perhaps some of these techniques may be applicable in the future to provide simplified processing of professional motion-picture films.

Film Processing Techniques and Equipment

During 1958, Bell & Howell made deliveries to the motion-picture laboratories of their new additive color printers.

In the Bell & Howell Additive Color Printer (Fig. 20), dichroic mirrors are used to split the white light of an incandescent 1000-w lamp into three fundamental color beams of red, green and blue. A perforated tape provides signals for starting and stopping the printer as well as the three-color light information and the signals for three different fade speeds. These tape signals are released to the printer either by a standard notch cue or by a patch cue. For the latter method a radiofrequency device is used and the film is not touched by any sensing probe. Facilities are provided for cleaning the aperture by means of an air jet.¹¹⁷

The Lipsner-Smith Corp. introduced Model CF 2 Ultrasonic Motion Picture

Film Cleaner (Fig. 21). This is an improvement of their Model CF 1 prototype. The Model CF 2 is a more compact machine completely self-contained with variable speeds of 30 ft/min to 120 ft/min employing ultrasonic energy in a solvent bath to clean all types of motion-picture film. In addition to removing all foreign matter from the film surfaces, the Model CF 2 completely eliminates the static electrical charge and the cleaned film is static free. An improvement in the solvent stripping system reduces solvent used to approximately 20% of that used in the Model CF 1. The Model CF 2 incorporates many safety features to guard against operator error or machine malfunction.

Advancing color technology played an important part in the 1958 operations of Unicorn Engineering Corp. The design, engineering and installation of a high-speed color processing machine at General Film Laboratories in Hollywood was a major project.

The machine is a tension drive combination 35mm and 35/32mm film processor featuring 165-ft/min capacity on Eastman Color Positive, all spray washes and impingement drying.

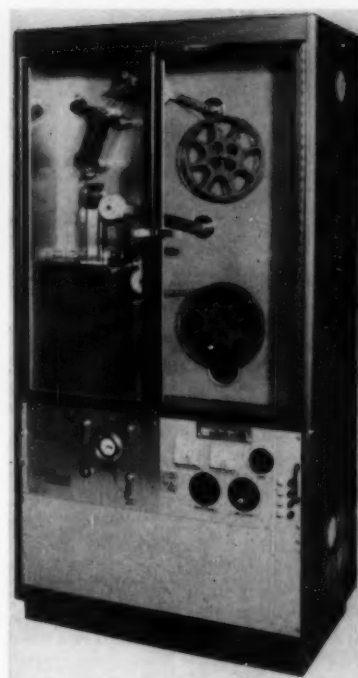


Fig. 21. Lipsner-Smith CF 2 Ultrasonic Motion Picture Film Cleaner.

In addition, the Color Robot, an additive, punched-tape controlled printer head for Models D and J printers, was developed. This high-efficiency color head makes scene-to-scene color corrections and light changes, and includes a built-in six-speed fader, all controlled from a single tape reader. A color version of the Keyboard-Perforator was produced to complete the package, designed to prepare scene-change tapes for either color or black-and-white printing.

Unicorn has redesigned several other products for increased efficiency. New bearings, contacts and drive provide a 30% increase in speed, while the movable, 30-point light change feature has been retained in the printer robot. The cleaner-rewind has been redesigned to give a more positive action in the dry cleaning of the film while it is being rewound for the next print. The tape splicer has been modified so that it can rapidly produce trouble-free splices in short lengths of slightly wound film such as gun camera and 35mm still camera film. The Unicorn Color Timer has been produced for reversal as well as negative-positive control.

Precision film rollers (Fig. 22), such as those used on Unicorn engineered equipment and the air-vacuum squeegee are now available. Previously available only in custom installations on printers, the unit is now released as a kit for user

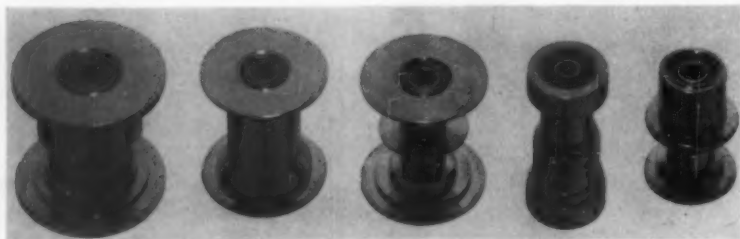


Fig. 22. Unicorn Engineering Corp. precision film rollers.

installation (Fig. 23). Using a compressed-air jet in a vacuum chamber, lint, dust and dirt are removed from both negatives and raw stock just prior to entering the printer gate.

In 1958 the General Film Laboratories completed its color developing facilities and offered a complete color negative/positive service. Preprinted, head identification leaders are now used on all television release prints. They are made by printing up "short ends" spliced together and processed in positive developer, but not cleared in a fixing bath. This yields the black silver exposed area on a white opaque background.

Additional high-speed action with 35mm printing equipment has increased production output. The equipment consists of modified Bell & Howell Model D machines, provided with a revolutionary light-beam switching system operating from punched tape over a 0.90 Log E range, and additional over-and-under-scale light values are obtained simultaneously from a punched card. Printer film speed is 360 ft/min and feed and take-ups will accept 3000-ft rolls. Expanded use of vacuum squeegees to dust both negatives and positives on the printing machines during the printing operation was made by installing these simple compact units on several machines.

An automatic duplicator has been designed to make identical duplicate tapes, transposing five-hole to eight-hole or eight-hole to five-hole tape information. It also includes a keyboard for making corrected duplicate tapes.

A Color Robot was put into production in the Fall of 1958. Consisting of a red, green and blue color modulating system using additive color correction information, the adaption of this Unicorn Engineering development on a Bell & Howell Model D printer also provides A & B printing ability with fade and dissolve lengths of 1-, 2-, 3-, 4- and 6-ft lengths. The color and density corrections and the length of fade or dissolve are programmed to the machine from a single, eight-hole punched-tape reader.

The electronics Department developed an "eddy current" clutch, which when coupled to a take-up drive provides for a constant tension from the beginning of take-up to up to 3000-ft rolls. The

device uses no sensing or control arm and is therefore adaptable to light-tight magazine operation.

Capital Film Laboratories reports increased use of automatic shutters on printers. They have installed a Hurlertron Automatic Shutter which has a very fast preset and shutter action, the shutter being lightweight and driven directly, with relatively low mass to move. The Hurlertron shutter is designed by Electronic Systems Inc. of Danville, Ill., a subsidiary of Electric Eye Equipment Corp. The shutter mechanism is pre-positioned by a servo motor which operates only during the pre-positioning cycle, a maximum of 400 msec. Upon cue, the new light setting is achieved in a maximum of three msec. The unit is built on modular construction and major parts are interchangeable.¹⁸ Several Unicorn Printer Robots are also in use at Capital.

Byron Motion Pictures, Inc., has installed a black-and-white 16/35mm spray developing machine which was manufactured by Hi-Speed Equipment Co., a division of Artison Industries. It was found that by covering the hypo and bleach tanks on the color processing machine with Plexiglas, the pH control of the other solutions in the machine is more easily maintained. The covered sections are vented by means of an exhaust fan to the outside atmosphere. This reduces the fumes which have a tendency to contaminate the alkaline solutions.

A change in the fader design at Byron Motion Pictures, from a constant speed motor drive to a direct gear drive from the printer gear chain, allows the changing of printer speed without affecting fade length.

The Calvin Company has developed a technique for making any desired length of fade or dissolve in the printing of A & B rolls of 16mm film. The company uses the matte method of fades, dissolves and wipes in printing, so the method consists of a means of making fades, not only of lengths generally used, but of any special length the customer may desire.

Hollywood Film Company introduced several new pieces of equipment for laboratory use. Figure 24 shows a negative breakdown rewind with two

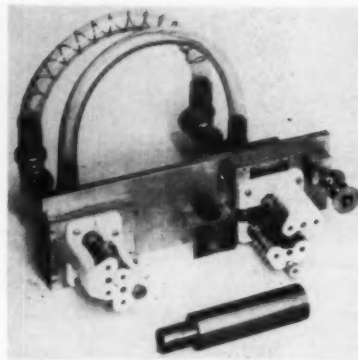


Fig. 23. Air squeegee kit, Unicorn Engineering Corp.

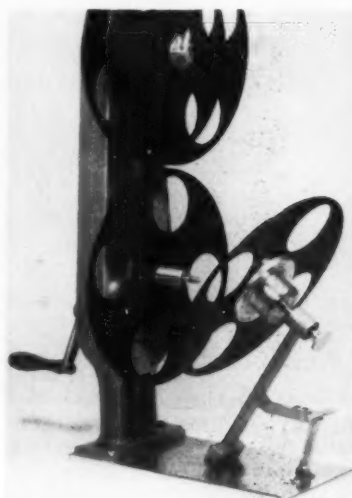


Fig. 24. Negative breakdown rewind, Hollywood Film Co.

shafts, one located above the other to permit the operator to wind scene takes and outtakes at one time on two separate spindles. When the handle is on the "In" position, the bottom reel can be wound and when the handle is pulled back, the top reel can be wound. In addition, the complete unit consists of a hinged 16/35mm companion flange and a come-apart reel. A torque motor rewind for breaking down 1000-ft reels of film is now available and an elbow tightwind (has been designed for winding up to 3000 ft of 16mm and 35mm film with a ball-bearing roller. A 16mm edge numbering machine (Fig. 25) to number every 16 frames of 16mm film to match 35mm footage is a great help to the film editor. Also available are 40-frame machines.

Hollywood Film also developed three new splicing machines, all of which feature: separate scraper block and cutter blades permitting double scrape; scraper blade adjustment block, adjustable blade positioning for adjustment of splice width and resharping of blades

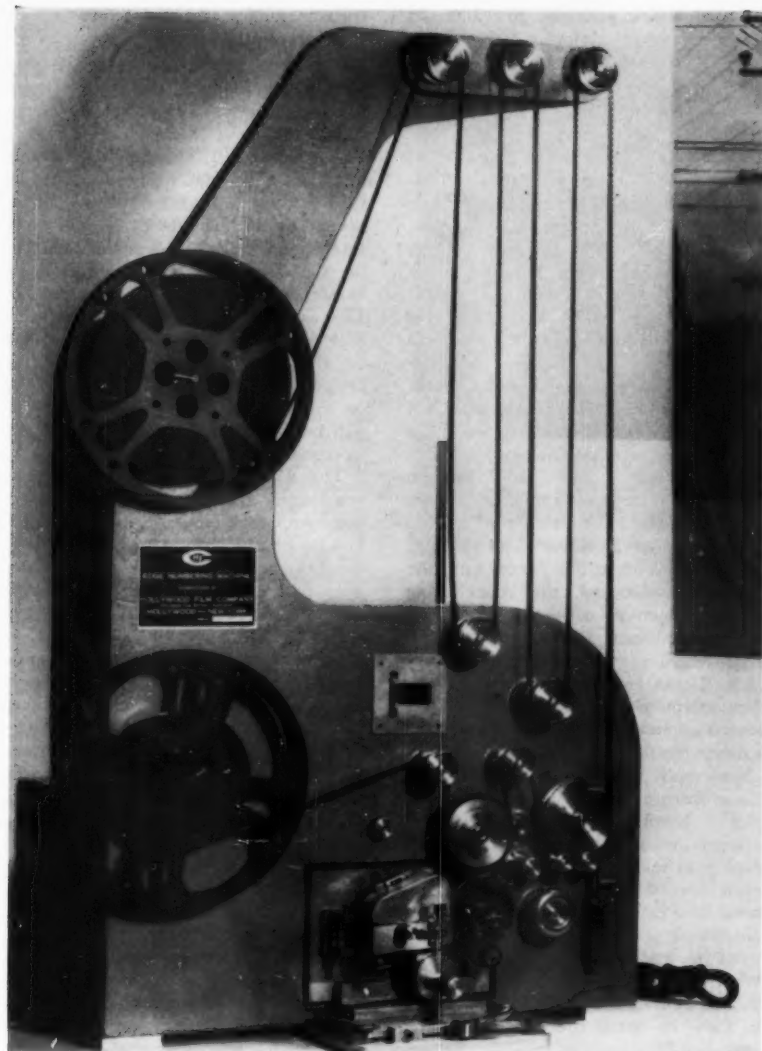


Fig. 25. 16mm edge numbering machine, Hollywood Film Co.

after extended usage, and thermostatically controlled blade temperature. Figure 26 shows a combination table-model hot splicer to joint 16-, 17½-, 35/32mm, CinemaScope or 35mm on one set of pins. The pin position is raised or lowered for the various widths of film. In addition, single-frame 35mm splicing can be done. The other two splicers are a combination table-model hot splicer for 35-, 65- or 70mm film, and a 16mm table-model hot splicer which allows loss of only ½ frame when necessary and permits the operator to splice from left to right or right to left.

Consolidated Film Industries, of Hollywood, expanded their color facilities during 1958. In addition to adding three Bell & Howell additive printers, additional 16mm and 35/32mm color printers of C.F.I. design were installed. A new building was constructed of which 4000 sq ft is now occupied for color

assembly, densitometry, control, color timing, color inspection and slitting. Additional spray-processing machines were installed for black-and-white processing of fine grains and dupe negatives. These machines operate at up to 200 ft/min and utilize impingement drying. The machines are equipped with the C.F.I. infrared replenisher monitoring system for automatic boost control. The firm is now using an automatic 1B sensitometer for making production control strips. This sensitometer, with a rotating prism to sweep the light beam past the step wedge, has been made automatic so that strips are exposed, punched, counted and advanced into a film magazine. Any number of duplicate strips may be exposed by setting a preset counter unit. A 12-position filter turret in the light beam permits easy selection and identification of filters for color or various black-and-white film emul-

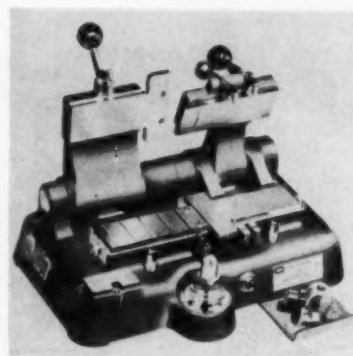


Fig. 26. Combination splicer, Hollywood Film Co.

sions. A black-and-white Cinex tester has been equipped with an improved light source. This is a gas-discharge type and has considerably more stability and reproducibility than a well-designed incandescent system. The rotating drum has been removed.

Also at Consolidated Film Industries, Title Dept. expansion of equipment and facilities for Eastman Kodak Color duplication has been proceeding rapidly. Two-color negative processing machines are in the construction stage with completion set for the middle of 1959. Other equipment introduced to the laboratories during 1958 includes an automatic shutter control and a printer roller-gate by Bell & Howell¹¹⁹; a rapid spray-processing machine for 16mm and 35mm films by Filmline Corp.¹²⁰; the new Oxberry animation stand¹²¹; the Panavision screen-brightness meter¹²²; and the Chemtrol Profax (polypropylene) ball valves.

A silver-recovery unit for operation at high current densities was announced.¹²³

The Eastman Kodak Company opened a Kodachrome processing laboratory in Panama City.¹²⁴

A mobile film-developing machine used for two years by CBS is now available commercially.¹²⁵

Movielab Color Corp. of New York opened a new color lab for 16- and 35mm negative/positive color and Kodachrome printing.¹²⁶

The TEL-Amatic 16/35 mm negative/positive film cleaning machine (Fig. 27) was introduced by S.O.S. Cinema Supply Corp. Recommended for use with S.O.S. Lotion, the machine has been designed for automatic and easy operation. Nothing more is required of the operation than to thread 15 ft of leader through the film path, fill the reservoir with cleaning lotion and throw the switch. Protection of the film is reported assured by a slip clutch and micro-switch triggered by release of film tension, similar to a buckle-trip in a camera. This combination halts the supply reel when it is emptied and also acts as a safety device if a splice should part.

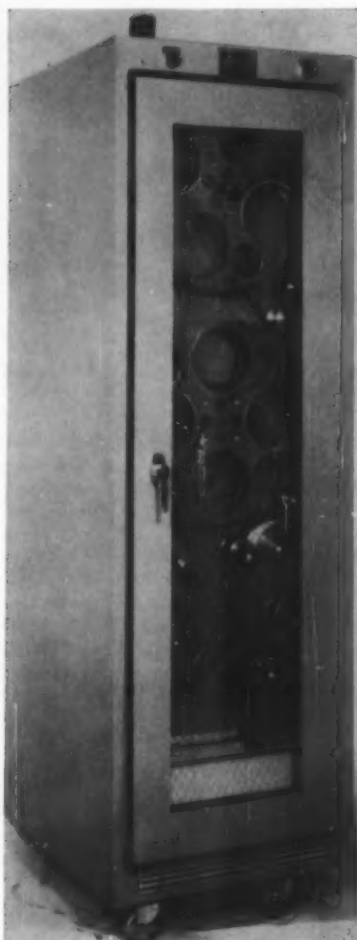


Fig. 27. TEL-Amatic 16/35 negative/positive film-cleaning machine, S.O.S. Cinema Supply.

The Color Labmaster, a color film processing machine for 16mm Eastman Ektachrome 7255 and 16mm and 35mm Anscochrome was announced by Houston Fearless Corp. The machine is automatic and daylight-operating with variable speed up to 30 frames/min.¹³⁷

A high-speed head for continuous black-and-white printing at 200 ft/min was announced by Fish-Schurman Corp.¹²⁸

Oscar Fisher Co. announced a silver recovery unit, Model 0-57, designed for the average processing laboratory.¹²⁹

A dirt-free exhaust hood was built by Eastman Kodak Co. to keep airborne dirt from settling on clean film.¹³⁰

The NCE 35mm Viewer was announced by National Cine Equipment Inc. A combination viewer, synchronizer, footage counter and frame counter, it can be used with a sound reader for single-system or, with additional 35mm or 16mm sprockets, for double-system editing.¹³¹

A new film cleaner with added lubricant was announced by Kodak. The

cleaner, which removes dirt and old lubricant while restoring the proper amount of new lubricant to the film, can be used on film striped with Kodak Sonotrack.¹³²

Medical

The Eidophor projector was demonstrated in December before the American Assn. for the Advancement of Science, Washington, D.C. Pictures of a heart operation were shown in color on a screen 16 ft by 12 ft.¹³³

The bones in a living human arm have been photographed with an ultrasonic recorder which had been developed by Argonne National Laboratory to test fuel elements for atomic reactors. The bones show as white spaces in a pattern of fine, "sawtoothed" lines traced by the recorder on electrosensitive paper. Two crystals are used in the assembly, one to transmit and one to receive ultrasonic waves. The recorder can be adjusted so that waves from the bones are absorbed, the bones being clearly shown as white spaces against the darker linear pattern traced by the recorder.¹³⁴

A 16mm reversal black-and-white film specially prepared for medical research applications in the study of tissue culture by means of time-lapse microphotography was announced by Gevaert Co. of America.¹³⁵

The Nikon extension unit was developed to make it easier for a photographer to take motion pictures of surgical operations. The unit, which has been used experimentally, consists of an aluminum pole, adjustable from 20 in. to 48 in., and a periscope finder system. With this device the camera can be located directly above the area of surgery to show in detail the progress of the operation.¹³⁶

The American Dental Assn. launched, in 1958, a program of education using motion pictures and other audio-visual aids. The program was planned for grade schools and high schools. Some of the high-school programs were directed toward students who might be considering dentistry as a career.¹³⁷

A Televisit booth was installed by Jerrold Electronics Co. in Bryn Mawr Hospital, Philadelphia. The system is especially designed to enable young children to "visit" their hospitalized parents.¹³⁸

The Strong Memorial Hospital of the University of Rochester, Rochester, N.Y., held a symposium on cinefluorography, November 14-15. Techniques and equipments used in x-ray motion pictures were discussed.¹³⁹

Dr. David S. Ruhe, of the Kansas University Medical Center, said in a speech that a TV camera which will transmit x-ray was being perfected and might be the key to solving the riddle of cancer.¹⁴⁰

Instrumentation and High-Speed Photography

The most significant event in this field during 1958 was the Fourth International Congress on High-Speed Photography, held in Cologne, Germany, during September. This meeting was well attended, and promises to add richly to the literature in this field when its papers are published during 1959. An invitation was extended on behalf of the SMPTE for the Fifth Congress to be held in Washington, D.C., during the fall of 1960 as the main portion of this Society's 88th Semiannual Convention. The dates for this event are now established as October 16-22, 1960. Further reports on the progress of this important event will be published in the *Journal* for the information of all interested persons.

The SMPTE *Journal* for April 1958 was largely devoted to papers included in a Symposium on Optical Instrumentation for Missile Testing held in Washington, D.C. It is significant that three of the nine papers in this group dealt with rather basic problems in visibility and seeing which affect all ground-based instruments that must look at objects in space. Included were a very thorough examination of the detection and recording of objects against a sky background by Martz¹⁴¹; and more general reviews of visibility and photography of distant objects by Schepler¹⁴²; and Duntley.¹⁴³

Kinder¹⁴⁴ reported work done at the U.S. Naval Ordnance Test Station, China Lake, Calif., in the use of airborne camera stations that can rise above much of the turbulence described in the first three papers but still derive data of sufficient accuracy through the simultaneous photography of the test object and a series of surveyed ground stations. A very interesting description of the various long-focal-length tracking camera objectives used at White Sands Proving Ground was given by Schendel,¹⁴⁵ while Clemente,¹⁴⁶ then of NOTS, China Lake, and now at the U.S. Naval Missile Center, Point Mugu, outlined the planning that had been done on a high-performance, versatile tracking mount known as TIM (Tracking Instrument Mount). In another paper by Schepler,¹⁴⁷ a general description was given of the photographic instrumentation used at the U.S. Air Proving Ground Center, Eglin AFB, Fla. An automatic exposure control device for another long-range tracking camera, the Perkin Elmer ROTI Mark II, was the subject of a paper by Economou, Luban and Mehr.¹⁴⁸ Finally, that issue of the *Journal* contains the transcript of a discussion on Missile Photography, chaired by Lipton.¹⁴⁹ The publication of round-table sessions such as this is a most valuable contribution to the field, since this is the way in which the most important problems confronting workers in the field are brought out.

The findings of a study conducted by the Boston University Physical Research Laboratories for the U.S. Air Force on Photographic Emulsions for Missile Photography were given in a paper by Howell.¹⁵⁰ It is especially appropriate that the information gained from such government-supported research be disseminated in the literature of this field, and this paper is a good example of this point.

The literature contained the usual manner of papers giving examples of how high-speed photography and photographic instrumentation are applied in the solution of specific research and engineering problems. Of special interest is the applications paper that brings evidence of a fresh approach or unusual depth of analysis. An example of this is found in the very thorough description of methods used by Lohse¹⁵¹ in the determination and control of color exposure in high-speed photography of self-luminous events, i.e., blast furnaces in steel mills. A less detailed description of the same work is contained in a paper by Lohse and Larsen.¹⁵² While there were several dozen other papers noted during the year that gave applications information, none was considered to be sufficiently basic or novel to warrant description here. It is of interest to note that the very elegant work of Fraser and Dombrowski of the Imperial College of Science and Technology, London, in the photographic study of disintegration of liquid sheets was illustrated in one publication,¹⁵³ although this lacked the technical details of the paper given by these authors during the Third International Congress on High-Speed Photography at London in 1956, and reported in the Proceedings of that meeting. Much more work of this quality is hoped for in this country. It is believed that workers in the field will benefit from a review of existing literature in the field, particularly the six reprint volumes on High-Speed Photography totaling more than one thousand pages that have been published by this Society. Availability of such information could do much to reduce the high rate of re-invention in this field, and the consequent republication of applications that are not new.

In the field of technical equipment, however, progress continued through 1958 at a rapid rate. The user of high-speed photographic instrumentation has available to him a constantly-growing array of high-performance cameras and accessory items that will certainly advance the field. At year's end, there was no sign that this trend was diminishing in any way.

While a review of this nature cannot attempt an all-inclusive listing of new products in any field, the following developments were considered to be of special interest:



Fig. 28. The PhotoSonics 16mm-1B Camera for 12 to 1000 frames/sec.

Prism Cameras: The familiar Eastman High-Speed Camera has been sold to Beckman & Whitley, and it is understood that extensive redesign work will be done on the camera. A 16mm Fastax, Model WF 4S, provides 400-ft capacity with daylight-loading spools, and permits start-stop operation at speeds from 350 to 9000 frames/sec. The PhotoSonics 16mm-1B camera, operating in the range from 12 to 1000 frames/sec, is now available with a 1200-ft film magazine (Fig. 28).

Very High-Speed Cameras: While some may argue with definitions, it appears that the Beckman & Whitley Dynafax 16mm camera falls in this category by virtue of its framing rate of 25,000 frames/sec.

High-Speed Intermittent Cameras: The D. B. Milliken Co. has developed two 16mm instrumentation cameras that operate at 200 or 400 frames/sec. Traid Corporation has announced its Traid 560 Fotomatic camera with a speed of 200 frames/sec for airborne use. While operating only up to 64 frames/sec, the Fairchild Thinform 16mm camera is listed, since it was designed for airborne use as an instrumentation camera; likewise, the Vought VDR-1630 Helmet Camera is included because of its unusual application in mounting on the helmet of a pilot, containing 30 ft of 16mm film. The 35mm Vinten HS-300 camera operates in the range from 24 to 300 frames/sec, and the PhotoSonics combination 16mm-1A (300 frames/sec) and 35mm-2A (200 frames/sec) is another example of a high-speed intermittent camera with pin-registered movement.

The 35mm Vinten HS-300 intermittent-motion camera, manufactured in England, is now available through Benson-Lehner Corp. of Los Angeles. The camera, designed for research work,

has an adjustable shutter to give openings from 170° to 10° and frame rates from 24/sec to 300/sec.¹⁵⁴

Ultra-High-Speed Equipment: Further development in Kerr cell technique was announced by Electro-Optical Systems, Inc., permitting exposure time of each photograph of 5 μ sec. Another Kerr cell shutter with an exposure time of 10 μ sec was announced by Avco Manufacturing Corp. It is significant that equipment of this capability is available on a commercial basis not too many years after the time when many workers in the field considered an exposure of 1 μ sec to be a fairly short exposure time.

Reconnaissance System: A complete photographic reconnaissance system for the RB58 supersonic bomber has been developed by the Fairchild Camera and Instrument Co. The system employs seven aerial cameras as well as a closed-circuit TV system.¹⁵⁵

While this review is necessarily a brief one, it may provide an indication of the continuing progress noted in high-quality equipment development in the field of high-speed photography and photographic instrumentation. This progress becomes very evident when one visits equipment exhibits at the meetings of technical societies in this field. The hardware seen there is evidence of the willingness shown by the photographic equipment industry to invest its funds in the new and improved equipment that is needed by the workers in this field.

An article on the part photography might play in the space age was published in Popular Photography.¹⁵⁶

The Armed Forces

The 60,000-ton aircraft carrier, the U.S.S. Saratoga, has become the first ship to have its own television station, operated by and for its own crew.

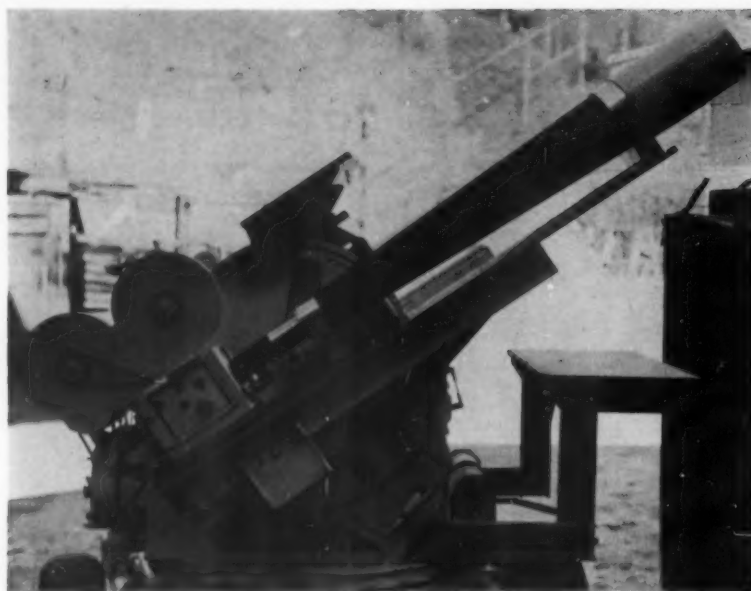


Fig. 29. Air Force M-45 Tracking Mount.

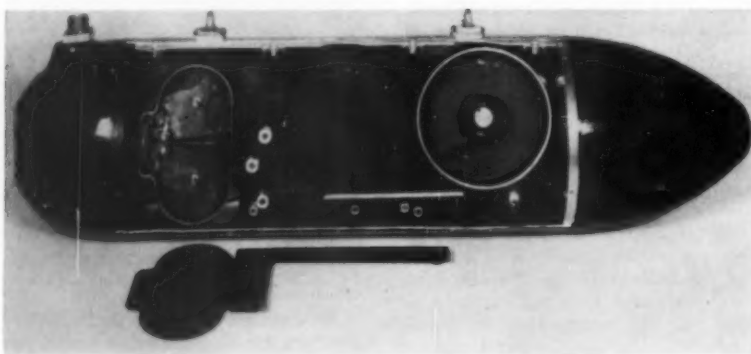


Fig. 30. Air Force T-1 Wing Camera Mount.

Station WCVA-60 TV, on Channel 6, transmits on very low power for the benefit of approximately 25 TV receivers located throughout the ship in mess halls, lounges, wardrooms and workshops. Live programs originating on the ship include newsreels, talent shows, shipboard ceremonies, and flight operations. Other entertainment is provided by the Armed Forces Radio-TV Service in the form of motion pictures and kinescope recordings of some of the nation's top TV shows. A larger transmitter is planned for the future to extend the range of the station to include other ships within a 15-mile radius.

A Helmet movie camera was designed by the Vought Company of Beverly Hills, Calif., to answer the pilots' data-recording problems when small space and light weight are essential.¹⁶⁷

The United States Army has successfully employed a new type of training aid called *Open End* discussion films. These are short films, averaging four to six minutes in length, which have proven

effective in triggering emotional responses in solving character problems and in the solution of puzzling leadership situations. The films develop a characteristic Army problem up to a certain point, and then the action is stopped at a crucial point without providing an answer or a solution. These films result in stimulated class discussions which frequently develop several solutions to a given problem. However, the end of the discussion usually results in agreement on the best answer. An increased degree of class participation and interest has been observed in the use of the *Open End* discussion films.

The M-45 Tracking Mount (Fig. 29) has been developed at the Lookout Mountain Air Force Station to meet the need for ground-to-air tracking of missiles, high-speed aircraft, and high-altitude balloon flights. The basic carrier is an M-55 50-caliber antiaircraft chassis mounted on an M-45 two-wheel carriage. Camera-mounting shelves to accommodate six cameras are installed

above and on each side of the operator. The side shelves mount cameras equipped with special 48-in. lens cones containing a 6-in. diameter *f*/8 lens made by Aaron J. Otto, which is used in conjunction with a Barlow lens placed in various positions in the field between the camera and the cone. This permits focal lengths of 96, 124, 150 or 184 in.

Spectacular photography has been achieved with this tracking mount. An example is that of a balloon suspending a rocket at an altitude of 96,000 ft. At a distance of 25 miles slant range, outstanding full-frame views were made of the rocket entering, passing through, and leaving the balloon.

The Air Force T-1 Wing Camera Mount (Fig. 30) was designed at Lookout Mountain Air Force Station to provide air-to-air and air-to-ground photographic coverage. The mount is relatively inexpensive, utilizing a T-1A Practice Bomb Rack as its main housing. A standard Bell & Howell A-7 Camera is used as the taking medium. To increase the capacity beyond the normal 100-ft loads, a Mitchell 400-ft magazine was mounted in the bomb rack, and a precision-made film transport chute was designed to carry the film from the magazine to the camera and return. The take-up reel of this large magazine is driven by a separate motor. The T-1 Mount fits on F86 and F100 jet aircraft on the wing mounting blocks. Firing of the camera is controlled by the pilot through normal bomb-release wiring. Excellent films of formation flying have been obtained by this camera from a trailing photo jet aircraft.

Video-Tape Recording

The rapid growth of video-tape recording (Fig. 31) since its introduction in commercial form three years ago is indicated by a tabulation of the cumulative number of machines in service at the end of the past three years:

End of Year	Machines in Service
1956	13
1957	32
1958	195

The three national networks accounted for 67 machines of the above total. Of the remainder, 63 units were located in 56 domestic broadcasting stations and 41 units in 16 foreign stations (in 7 countries). U.S. Government organizations, six independent TV program producers, five research laboratories, a university and a racetrack accounted for the remaining units. As of the end of the year, indications were that the number of machines in use would continue to grow at a rapid pace.

The largest single application, in terms of machine hours of use, was the time-zone delay operation undertaken



Fig. 31. A typical installation of two tape machines with supporting terminal equipment in the background.

by the networks. ABC, CBS and NBC employed the machines throughout the year for delaying West Coast broadcasts either two or three hours depending upon operating requirements. In addition, during the six-month Daylight Saving Time period a one-hour delay operation was undertaken to accommodate those stations located in areas where Daylight Saving Time was not observed. Thus, all stations, whether in a Daylight Saving Time or a Standard Time Zone, continued to receive their programs at the same clock time throughout the year. The quality of the recording and the reproduction process reached a level such that, with properly operated video-tape equipment, the average viewer was seldom conscious of whether he was viewing original program material or a tape recording. Even skilled observers sometimes found it difficult to distinguish between the two with certainty.

The importance of video-tape recording to broadcasting networks may be judged by the example of CBS which with 184 connected stations comprising its network, had only 53 receiving their programs last summer during the original performance while 131 were receiving all network programming (both live and film) from video tape. The operations of the other networks were similar but differed as to details and extent.

The magnitude of the network Daylight Time delay operation is evident from the fact that CBS recorded approximately 100 hours of programs each week and played back over 120 hours (Fig. 32). NBC recorded approximately 80 hours per week and played back 130 hours. Since these recordings and playback operations are normally undertaken in duplicate, over 400 machine-hours per week of operation was undertaken by each network for delay purposes alone.

In addition to network delay operations, video-tape machines were used by

both individual stations and networks for a variety of other applications including the recording and reproduction of (a) complete television programs, (b) program inserts for integration with live, tape and film programs, (c) commercials, (d) topical news segments for delayed or repeat release and (e) auditions and rehearsals.

The question of interchangeability (the recording of a tape on one machine and its playback on another) was resolved satisfactorily for monochrome applications. Both the exchange of programs between stations and the syndication of a program series among a limited number of stations were regularly practiced.

Although interchangeability became an everyday reality, operating standards to insure such interchangeability remained to be formalized. To this end the Society authorized the formation of a Video-Tape Recording Committee late in the year and charged it with the responsibility of proposed standards that would facilitate the interchangeability of tapes used with machines designed and manufactured to meet the standards. By the end of the year a good start had been achieved on the problem which, to avoid the possibility of stifling future developments, is being approached with due respect for long-range consequences.

A unique international application for video-tape recording occurred during the Coronation of Pope John XXIII. The 625-line, 50-frame TV pickup made in Rome was relayed via Eurovision to England where it was converted by B.B.C. to the British 405-line, 50-frame national standard at Dover, thence transmitted to Manchester where Gran-



Fig. 32. The playback switching control room of a tape-recording plant (CBS-New York). The vertical panel in front of the operator contains the controls for starting and stopping 16 tape machines and for the selection of the machines to be used for feeding the outgoing circuits. The horizontal panel contains controls for gang starting and stopping of the machines and for intercommunications.

ada converted the signal to the 525-line, 60-frame U.S. standard and recorded it on video tape. The tape was then flown from London to Paris where it was put on a jet airliner and flown to the U.S. In this country CBS broadcast the original tape from New York to the eastern and midwestern parts of the country and simultaneously re-recorded it in Hollywood for a delayed broadcast to the Pacific Coast audience.

In April 1958, B.B.C. unveiled its Vision Electronic Recording Apparatus (VERA) which operates on a principle different from American video-tape recorders. A $\frac{1}{2}$ -in. wide magnetic tape, running at a linear speed of 200 in./sec is used. A reel 20 $\frac{1}{2}$ in. in diameter can accommodate 15 min. of recording.

The machine employs three tracks, two for video information and one for audio. Video frequencies below 100 kc are recorded on one track using frequency modulation. The higher video frequencies are recorded on a second track in the conventional manner. As of the end of the year, the equipment was not in extensive commercial operation.

Video-tape recording of color TV program material advanced during the year. Sixteen of the NBC and two of the CBS machines are capable of recording and reproducing color. Most of the color machines in service are modified monochrome units indicating the practicability of this approach to the problem of color television. During the Daylight Saving period, NBC recorded approximately 15 hours of color programming each week and it was played back twice for different time zones, making a total of about 30 program-hours per week of playback.



Fig. 33. Closed-circuit TV used for checking payroll savings accounts at Community Savings Bank, Rochester, N. Y.

TELEVISION

The growth of the TV networks in the United States is worth noting. During 1958 approximately 5300 channel-miles of facilities were added to the networks, bringing the total to about 82,800 channel-miles. About 5280 channel-miles of radio relay were placed in television service. By the end of the year network service was available to 610 stations in 403 cities—a growth of 97 stations and 55 cities since 1957. During this period the total channel-miles of network equipped for color transmission increased to about 78,500, a gain of about 5160 channel-miles.

Sales statistics for domestic receivers are also indicative. The Advertising Research Foundation estimated that 84% of all homes in the United States have television. Statistics based on a survey by Sylvania's Research Director, Frank W. Mansfield, showed color-set production in 1958 at 145,000 sets and sales of 160,000 sets. A breakdown of 1958 sales, according to picture-tube size, showed 249,000 under 15-in.; 1,341,000 in 16- to 18-in.; 3,316,000 in 19- to 21-in.; and 229,000 in 22-in. and over.¹⁵⁵

Educational and Closed-Circuit TV

Here are reported the many activities other than those of the commercial networks. These are chiefly, but not solely, educational and closed-circuit uses and means.

Closed-circuit educational television continues a modest growth. The nation's major experimental educational TV system at Hagerstown, Washington County, Md., had grown since its inception in 1956 to about 100 circuit-miles, to which 45 miles are soon to be added. All 48 schools in Washington

County are participating. County superintendent of schools, William B. Brish, summarized, "It deserves a place alongside the textbook as the most important educational advance of the century." ETV is expensive, however. At Hagerstown, the equipment cost \$250,000 and it took an additional \$281,000 in the first two years for teacher training, and operating expenses. So far, the Hagerstown experiment has not shown a reduced need for the teacher; so instead of saving money in one place to pay for the ETV, the cost is added onto the school system budget.¹⁵⁶

There are other smaller systems in use—at Cortland, N.Y.; Franklin County, Ky.; and at San Jose State College, Calif.

The closing of public high schools in Little Rock, Ark., gave educational TV a major trial over an extended period of time. Prior to this, some school systems used the medium during teachers' strikes. It was demonstrated in Little Rock, however, that TV teaching is only a supplement and not a substitute for a regular school system.¹⁵⁹

Educational uses of television have been widely publicized. There has been a great deal written on the subject; but there is only a meager array of facts showing concrete results. Francis E. Almstead, New York State Education Dept. TV Consultant, reported a few months ago: "Educational television's advantages are not yet proven."¹⁶⁰

Literally hundreds of research projects and experiments are in progress on all levels of education. Most educators expect that the results of this research will be proof that this newest of audio-visual mediums will do much to improve instruction and alleviate some of the cur-

rent problems such as the shortage of teachers.

Twelve new educational stations went on the air in 1958, raising the total to 39, serving an area of some 50 million people. Similarly, closed-circuit installations increased. The Educational Television and Radio Center in a survey estimated that the number of broadcasting hours doubled in 1958 over 1957.

When there are no local educational channels in operation, certain commercial stations provide free time or, in some instances, sponsored time for educational programs. WJAR-TV, Providence, R.I., has a weekly show, *The World Around Us*, which draws about 300 letters each week. This is an amazingly strong response.

Probably one of the most discussed educational programs of 1958 was *Continental Classroom*, a nationwide elementary physics course presented by the National Broadcasting Co. Although designed primarily for high-school science teachers, a surprising number of housewives, men and children are rising about 6:00 A.M. to take this atomic-age course. The program is sponsored jointly by ten companies and foundations. Reports indicate that 7000 teachers are taking the course for credit while thousands of others are auditing it.¹⁶¹

Closed-circuit television is being used in varied fields, among which are sales and entertainment, besides education. On January 12, 1959, the largest closed-circuit network of its type was set up by Theatre Network Television, Inc., for International Business Machines. Originating in San Francisco, it was fed to 151 locations in 138 cities.

On March 4, 5 and 6, 1958, Tele-Sell, a course on salesmanship and management devised by Tele-PrompTer, was supplied to 42 cities. The Robinson-Basilio fight, originating in Chicago on March 25, 1958, was supplied to 172 locations in 140 cities by TelePrompTer.

In Kansas City, Mo., Trans-World Airlines have installed closed-circuit television at their public information booth. Traditionally, airlines maintain one or two large boards behind the ticket counter to indicate the progress of various incoming and departing flights. Usually, behind scenes in operations, another such master board or boards are maintained for the benefit of company personnel. By beaming a fixed TV camera at the operations flight boards, closed-circuit TV receiver sets at the public information booth out front carry up-to-the-minute flight information simultaneously without the necessity of an employee correctly posting flight data continually. Additional receiver sets can easily be placed in lounges, restaurants, and other public spots to keep waiting passengers up to date.

In New York City's mammoth Pennsylvania Station, the Long Island Rail-

road has installed closed-circuit TV to direct commuters to the correct track for departing trains. In the station-master's office there is a revolving drum with 2 by 2 slides, each listing the correct data (destinations, departure time) for one of the trains scheduled to leave by that track during the day. A small TV camera next to it focuses on the slide and transmits the notice to the 27-in. TV screen mounted beside the gate number.¹⁶²

Community Savings Bank of Rochester, N.Y., has installed closed-circuit equipment between certain tellers on the main floor and the control film room upstairs (Fig. 33). When a teller at one of the payroll savings windows needs to check a depositor's account, the teller no longer need go to a massive file and search out the account card and occasionally go to the accounting department to secure it. The teller merely calls the account number upstairs where a file clerk can locate any given card within seven to ten seconds. This service allows a teller to handle more customers in a given period of time.

Color

Color broadcasting during the past year has continued to receive a large amount of attention from one network, with only a nominal amount of live and film programming on a national or local basis from the others.

The technical quality of live color programs has reached a high level of excellence due primarily to application of standardized operating and color balance methods, to greater care in studio lighting and staging.¹⁶³ Chroma-Keying, as a tool in color programming, for electronic scene insertion or combining outputs of color cameras has become widespread and elegant in its execution.¹⁶⁴

The introduction of video-tape color TV recording and playback for daylight saving and time-zone delay or storage on April 30, 1958, has brought with it the growing pains usually encountered with new techniques. It has been found that while excellent color fidelity can be obtained in playback under test conditions, it is necessary to control many operational variables within narrow limits if the service is to provide an adequate substitute for live color signals.¹⁶⁵ Such control techniques are now being developed under broadcast conditions and have resulted in tangible improvements in color rebroadcast quality.

Closed-Circuit Color

A closed-circuit live TK-45 color TV vidicon installation was made at the University of Michigan Medical School.¹⁶⁶

A "see-yourself" color installation using the TK-45 vidicon camera was opened by RCA at the Museum of



Fig. 34. RCA transistorized portable vidicon color camera.

Science and Industry in Chicago in March 1958.

A Mobile Color Caravan using three image-orthicon cameras and associated equipment was delivered by General Electric Co. to the U.S. Army Pictorial Center in November 1958.

A public demonstration of large-screen color was given at Minneapolis in December 1958 by Smith, Kline, and French, using Philips Schmidt projectors. CIBA demonstrated sequential-color and large-screen projection with the improved Eidophor equipment in Washington, D.C., in December 1958.¹⁶⁷ Highlight brightness of six foot-lamberts was achieved with 12 by 16-ft pictures.

RCA demonstrated color TV at the Polish International Trade Fair, June 8-22.¹⁶⁸

Brightness standards for color TV tubes are now available from the National Bureau of Standards.¹⁶⁹

Equipment

The General Electric Co. brought out a new device to aid video synchronizing for TV stations.¹⁷⁰

The Spectra, reported to be the world's smallest TV high-definition camera, was made by the Photo Research Corp.¹⁷¹

A method of broadcasting composite pictures on television known as Video-Scene was announced by CBS. This system made it possible to combine different scenes of live action and different-sized sets.¹⁷²

Dage Television Div. of Thompson Ramo Wooldridge Inc. developed an "automatic" TV camera. It automatically accommodates a light range of 120 to 1 and in addition self-adjusts beam, target and electrical focus circuits to optimum values.¹⁷³

A cathode-ray storage tube that can "memorize" and display TV pictures at a later time on its own built-in screen is in production by Westinghouse.¹⁷⁴

Magnecorder made a new recording head all of metal instead of metal and plastic. This is said to reduce head wear.¹⁷⁵

At the N.A.B. Convention in Los Angeles, RCA showed automatic programming equipment designed for TV station breaks.¹⁷⁶

Development continues on broadcast color cameras for live and film pickup. An "ice cube" dichroic prism assembly was developed and tested for the RCA TK-26 vidicon color film chain to replace the currently used dichroic sandwich mirrors. This approach eliminates annoying "ghosts" caused by unwanted reflections from the protective glass surface. The prism construction in effect provides a "pellicle" film without the limitations of pellicle constructions. Conversion kits are now available for the prism modifications.

A parallel development for the TK-41 live image-orthicon color camera replaces the sandwich dichroics with a prism assembly. Since all dichroic surfaces are now sealed prism interfaces, the optical assembly is rugged and easy to maintain at top working efficiency.

An experimental $\frac{1}{2}$ -in. vidicon live color camera and colorplexer system using 300 transistors and weighing 65 lb was announced and demonstrated both on broadcast and closed-circuit use (Fig. 34).

Pay Television

During 1958, the major companies in the pay TV field disclosed no fundamentally new developments. International Telemeter Co., a Division of Paramount Pictures Corp., brought out a restyled and considerably improved version (Fig. 35) of the closed-circuit coin-box system it announced the year before. The Telemeter home unit attaches to the antenna terminals of the television set and incorporates the



Fig. 35. Part of Telemeter Home Unit, with price-display and coin-chute cover open.

features of variable pricing, credit storage, tape recording, and a separate audio channel for selling pay TV programming.

Jerrold Electronics Corp. demonstrated the remote billing system reported in development, in the 1957 Progress Report. The system furnishes two channels of pay TV programming. Customers purchase programs by pushing a button. This action, in addition to making the program available, causes a recording to be made at a central point. Technical details of the system were being kept confidential at the time this report was written.

Other companies in the field did not announce any new developments.

Meanwhile there exists considerable disagreement as to the feasibility and desirability of pay TV, and its legal status remains unclarified.

Telemovies suspended operations in Bartlesville because of financial losses.¹⁷⁷

British Broadcasting Corp.

During 1958 coverage of the B.B.C. television service was further increased to 98.3% of the population of the United Kingdom. This increase was achieved by the following changes or additions to the B.B.C.'s television transmitting stations which now number 22:

1. The opening of a temporary low-power station at Dover (Figs. 36 and 37) in East Kent.
2. The final increase in the power of Norwich in East Anglia to an e.r.p. varying with direction from 1.3 to 15 kw.
3. The start of transmissions from the first experimental unattended translator at Folkestone which receives the Dover transmissions and retransmits in another channel from an aerial giving good line-of-sight coverage to the town of Folkestone.
4. An increase in the e.r.p. of Blaenplwyf in Wales to 0.5 to 1.6 kw (directional aerial).
5. The opening of temporary low-power stations near Wich, in the North of Scotland, and in the Orkney Islands off the North coast of Scotland. Both of



Fig. 36. The B.B.C. Continental television link station at Swingate, near Dover. Camera is "viewing" a 405-line picture and converting it to the 625-line standard.

these stations will be replaced by permanent higher-power installations during 1959.

Construction of a number of low-power stations of design similar to the unattended translator installation at Folkestone is planned.

This first British low-power translator began its service trials at Folkestone during the year (Figs. 38-40). The design of a translator for the British television standards presented more problems than the corresponding installations in Germany and Italy, since the British use of amplitude-modulated sound makes it difficult to avoid intermodulation if a common amplifier is used for vision and sound signals. In the B.B.C. equipment, separate channels have been used for the amplification of the two signals, using a common frequency-changing process which facilitates the rejection of spurious signals and provides additional protection against "in-band" feedback. The transmitter output power is 1.5 w and the effective radiated power is 7 w in the direction of maximum radiation. Experience in the operation of this equipment has been used in the design of a second, somewhat simplified, version with increased power output.

Studio developments include the return to service of the main studio in Birmingham after being modified and re-equipped. Additionally, interview studios were provided in Birmingham, Bristol, Southampton, Newcastle and Belfast, and in each of these vidicon camera equipment has been installed.

The number of television licenses increased during the year from 7½ million to nearly 9 million.

Tri-Alkali Mosaics: The use of tri-alkali mosaics in the C.P.S. camera



Fig. 37. Adjustments being made to 405-line picture visible on right. Camera on left works on 625 lines and converts 405-line picture to 625-line standard.

tubes in three of the Lime Grove studios has increased the sensitivity by a factor of approximately three. A further useful improvement is being realized by the replacement of the remotely controlled iris diaphragms — the filters have a minimum transmission loss of about 15%.

These two changes have helped to make it possible to adopt a standard lighting level of 75 ft-c in both C.P.S. and image-orthicon equipped studios.

Differential Aperture Correction: The linear transfer characteristic of the C.P.S. Emitron camera tube necessitates the use of gamma correction. The overall gain of camera and gamma corrector is therefore relatively high at low gray-scale levels, and the noise level is therefore greatest in the darker picture areas. A new modification reduces the high-frequency response at or near the black region, and this permits the application of overall high-frequency boost to produce improved picture definition without causing excessive noise in the darker areas.

A new talk-back system, which includes a highly directional loudspeaker, is being developed by the B.B.C. Research Dept., and has been successfully tested on transmission. It uses two loudspeaker elements in a combination giving an approximately cosine-squared polar diagram, and is small enough to be mounted on a microphone boom in such a way that it can be heard without being picked up by the microphone. This allows speakers in different studios to converse without the use of hearing-aid earpieces or similar devices. The frequency band covered by the system is limited to about two octaves, which is adequate for intelligibility.

Telerecording: Closer control of density variations in television film proc-

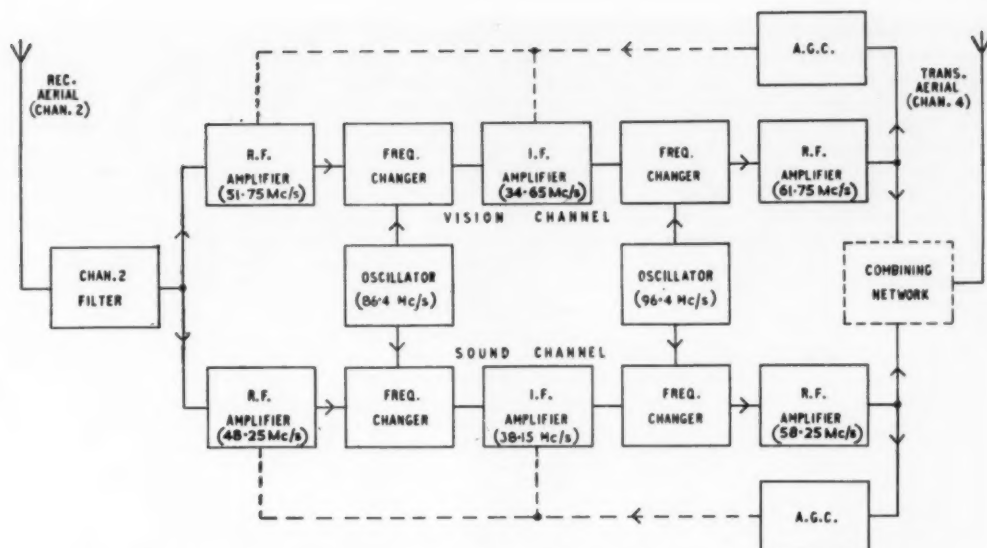


Fig. 38. Schematic of translator at Folkestone.

essing has raised the standard of 35mm telerecordings to such a degree that it has been necessary to remedy minor defects which were formerly unnoticed. Line strobing has been reduced by an improved form of spot-wobble to give the broadened line a more uniform brilliance across its width and sharper cut-off at its edges. The slight strobing which persisted was traced to movement of the film in the gate while it was nominally stationary. This movement was reduced by improvements in the design of the register pins in the pull-down mechanism. Spot-wobble was also applied to the flying-spot 35mm telecine channel which is normally used for the transmission of stored-field telerecordings.

Three 16mm suppressed-field telerecording channels have come into operational use at Lime Grove during the year, and it has been possible to compare their performance with that of the 16mm fast-pull-down channel. In spite of the fact that the latter is a "full information" system, there is little difference in the overall assessment of the two systems, probably because the performance of both is limited by the fundamental resolution of 16mm film. The suppressed-field system has a slightly lower signal-to-noise ratio and shows the inevitable serration of sloping lines in these pictures. However, the fast-pull-down system shows greater breakup of moving images because of the time interval between the two successive fields which are recorded on each film frame.

Xenon-Filled Illuminants: Small xenon-filled discharge tubes are being used experimentally as illuminants in 35mm projectors in a film-dubbing theater.

These tubes have a working life comparable with filament lamps and do not need the attention and maintenance re-

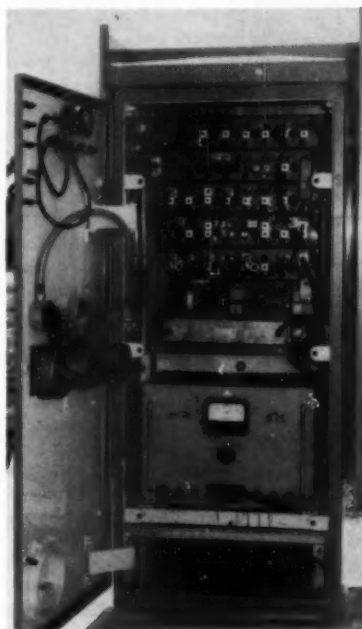


Fig. 39. Inside of translator unit cabinet.

quired by carbon arcs compared with which they give a more continuous spectrum and therefore better color composition of the light output. The power consumption of xenon illuminants is approximately the same, for equal light output, as that of carbon arcs if run from d-c supplies designed for carbon arcs or studio production lighting. A momentary striking potential of about 5 kv is required; the diameter of the light source is about 4 mm.

The 2-kw version of the illuminant being used has a cold gas pressure of about 2 atmospheres rising to 6 to 8 atmospheres at running temperature.

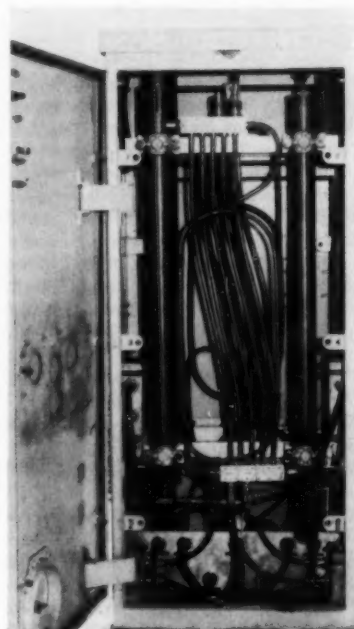


Fig. 40. Inside of combining network cabinet, Folkestone translator.

Larger versions, suitable for large-theater projection, have higher efficiencies as a result of greater pressure — in this case about 5 atmospheres cold rising to 15 to 20 atmospheres when running.

The ultraviolet content of the light output tends to produce ozone especially under humid conditions and this must be convected away by a flue pipe.

At Broadcasting House, Manchester, a new type of Television Switching Centre was brought into service, the main feature being that twelve program

sources can be routed to nine destinations, in any combination, by means of pushbuttons on a control desk. New types of video and distribution amplifiers, designed for the future B.B.C. Television Centre in London, form the basis of the system, and all vision switching is carried out at video frequency. The sound components of programs are normally switched by relays operated in conjunction with the vision relays, but it is also possible to route the sound independently.

Testing Video Transmission Systems: The B.B.C. has now standardized the testing of video transmission systems by the "sine-squared pulse and bar" method. This method, which has been accepted by the C.C.I.R., uses a waveform consisting of a sine-squared pulse (originally suggested by the British Post Office) and a flat-topped bar and is generated at line frequency with synchronizing pulses. The waveform can be generated with close conformity to the standard by a reasonably simple means. Measurements on any transmission system under test are made by examining through specially prepared graticules an oscilloscope display of the waveform after transmission. The distortions noted against the graticule give a direct measure of the fidelity of the transmission system in terms of a "rating factor" which is weighted according to the visible effects of the various distortions. In general, low-frequency performance is indicated, down to line frequency, by distortion of the bar waveform and high-frequency performance by distortion of the pulse waveform.

Two series of experimental transmissions in Band V were made from the Crystal Palace Station: on the 405-line British standards from October 1957 to March 1958 and on the C.C.I.R. 625-line standards from May to August 1958. The purpose of the transmissions was to assess the service which could be provided by transmissions in Band V and direct comparisons were made with reception of simultaneous transmissions from the Crystal Palace Band I transmitters.

A series of color field trials of a 405-line version of the N.T.S.C. system was completed during the year, and the results have been analyzed statistically. In general, color pictures provided by the system with the picture sources and display tubes presently available have been judged by the observers to be satisfactory. Registration in the color camera was found to require attention and certain features of the display tube were thought to leave room for improvement, but the technical performance of the system itself was found adequate for a satisfactory color television service in the frequency bands at present in use. Eighty-nine per cent of the observers re-

garded the reproduction of the live scenes as satisfactory. Reproduction from 35mm film was regarded as satisfactory by all observers, from 16mm film by 93%, and from slides by 98%. These results were influenced by the fact that the color rendering of the 16mm film used during part of the trials was inferior to that of the 35mm films. It was also found that the non-engineer observers allowed the entertainment value of the pictures to influence their judgment of the technical merits.

The compatibility of the system was found to be generally satisfactory, but 6% of the engineer observers reported trouble due to asynchronous working. No tests have yet been carried out to assess the effect on compatibility of lack of registration in the camera. Reverse compatibility was found to be generally satisfactory.

Live picture transmissions have ceased for the time being, but color films and slides will continue to be transmitted from time to time in order to provide a source of color picture signals for color receiver development work.

Test equipment for simulating transmission paths has been developed and is now being used at B.B.C. outside broadcast bases for testing shf (super-high-frequency) link equipment prior to use for program commitments. The tests are made with a length of waveguide which, when connected between the output waveguide of a shf link transmitter and the input waveguide of a link receiver, can interpose accurately calibrated variable attenuation. The calibrated attenuation simulating actual transmission paths is provided by moving a glass block so that it obstructs a varying proportion of the interior of the waveguide.

Television in Europe

Eurovision, the television community of Europe, now consists of 12 countries: Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Italy, Luxembourg, Monaco, Sweden and Switzerland. In 1958, Stockholm was connected to the Eurovision network by a microwave relay, about 400 miles long. With the Eurovision network, a quick change of programs from different countries is now possible. The complete network has a length of more than 10,000 miles, with about 400 television transmitters working for nearly 13 million television receivers. For the first time, parts of the Salzburger Festspiele have been transmitted by the Eurovision transmitters, and programs are transmitted from isolated mountainous regions. Scenes of the Hahnenkamm ski races were sent out by all Eurovision transmitters in January 1959 (Fig. 41). It is possible that there will be an extension of the Eurovision network to Spain, Portugal, Yugoslavia, Czechoslovakia and Eastern Germany.

In Russia, television is concentrated within the large cities. By 1960, 75 television transmitters are expected to be operating in Russia.¹⁷⁸ In Czechoslovakia, television is making good progress. Five television transmitters are in operation and the number of receivers is about 300,000. The manufacture of receivers is being boosted in every possible way and in 1958 a new TV receiver plant was opened. It will produce 100,000 receivers each year, provided they can also be sold to the west of Europe. In the year 1959, the TV network will have progressed so far, that two-thirds of the country will be reached by programs.

Three transmitters were put in service in Switzerland in 1958, one on top of the Santis¹⁷⁹ and two (Fig. 42) in Italian Switzerland, producing telecasts for nearly the whole population of this part of Switzerland. The high mountains in this country cause difficulties in connection with the distribution of programs. Another problem arises from the fact that there are four distinct groups of people within Switzerland, each speaking a different language and each wanting transmissions of its own.

Dr. Gretener died in Switzerland in October 1958. It was he who, after the death of Prof. Fischer, developed the large-picture television system, Eidophor.

The Fernsehtechnische Gesellschaft in Germany, an institution for dealing with television problems, held a convention in Munich in September 1958. Many interesting papers¹⁸⁰ were read on this occasion.

In twenty-three countries in Western Europe, 431 TV transmitters are operating for 12.9 million receivers. In eight countries in Eastern Europe, there are 99 transmitters and 3.1 million receivers, giving a total for the whole of Europe of 530 transmitters and 16 million receivers.¹⁸¹

Africa

Very few technical developments are reported for 1958. However, producers are mostly changing over from 16mm to 35mm because of a new local entertainment-tax rebate which is refunded by the South African Government of South African produced films. The government subsidy is 10,000 pounds sterling (\$27,800.00) in the form of an entertainment-tax rebate.

Despite the fact that South African laboratories are protected by an import duty of 10d per foot on overseas films, there is very little increase in the number of laboratories or facilities offered in view of the fact most of the exhibition houses are controlled by the 20th Century Organization.

In recent weeks there has been considerable discussion about the introduction of television in South Africa, but there are political difficulties in con-

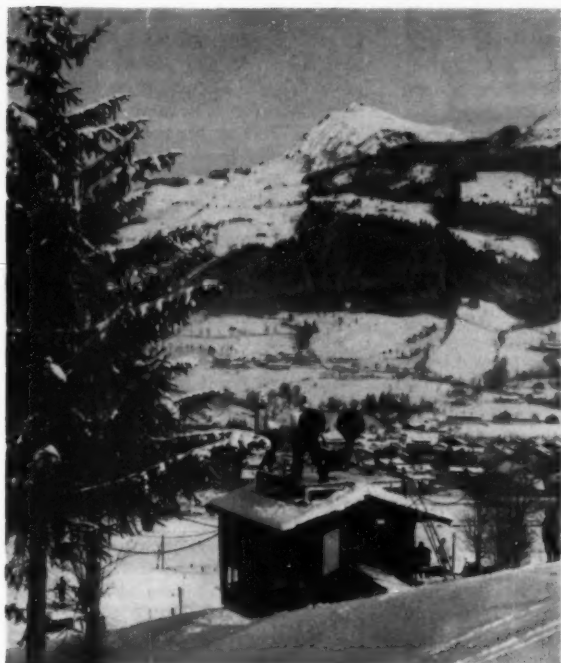


Fig. 41. The television video center in a hay hut near Kitzbuhel, Austria, for transmission of the Hahnenkamm ski races by the Eurovision in January 1959. The first relay station is on the 6500-ft high Kitzbuhler Horn in the background.

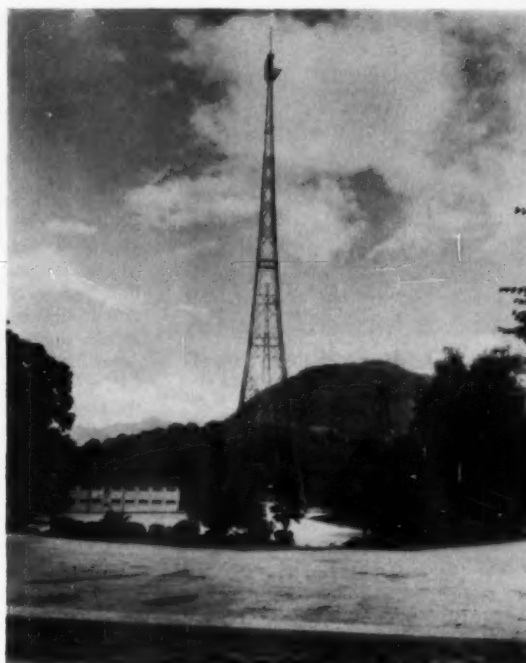


Fig. 42. The antenna of the television transmitter of Monte Ceneri in Italian Switzerland is placed on top of one of the masts of the medium frequency broadcasting transmitter.

nection with bilingualism and reports about the introduction of television have not been confirmed.

In view of the sparse population of three million Europeans, it has not been found that it is not an economic proposition at present. In any event there are parliamentary discussions with regard to the necessity of two channels, one in each official language, English and Afrikaans, which, of course, makes this doubly expensive. There has also been talk of two different language times on one channel, but agreement has not been reached. In any event, when television is introduced, it will probably be commercial television.

The two largest film laboratories are operated by the Government Education Department. These laboratories have full facilities for 35mm production and for reduction to 16mm for the use of schools, universities, etc. Government Film Services employ Arnold & Richter processing equipment for handling of Ferranicolor and Eastman color. Animation facilities are also available as well as facilities for dubbing overseas productions into the Afrikaans language.

The second largest laboratory and producers, African Film Productions of Johannesburg, have facilities for processing in Eastman color. A number of productions are made for various Departments of the Government in 35mm black-and-white and Eastman color.

Film Production Facilities at Irene

have facilities for 35mm and 16mm productions in Eastman color and Ferranicolor and black-and-white. The organization also has installed magnetic striping facilities and maintains studios and equipment for rental to producers.

N.R.S. Film Laboratories of Pretoria specialize mainly in service for amateur photographers and 16mm Kodachrome duplication. The facilities have also been expanded to the processing of 16mm Eastman color and magnetic striping of 16mm and 8mm films.

Cine-labs (Pty) Ltd. of Johannesburg are making plans for the advent of television in South Africa and are now equipped for processing 16mm and 35mm in both black-and-white and Ferranicolor. The laboratory is also equipped for magnetic striping, reduction from 35mm to 16mm and enlarging from 16mm to 35mm.

Dave Millen Productions of Johannesburg offers production facilities for producers in 35mm and 16mm. Most of the work is for overseas producers who come to South Africa for production of films for overseas distribution.

Cine Union (Pty) Ltd. of Johannesburg specializes in documentary films made in mines, institutions, universities, etc. A number of small producers are readying equipment and facilities for television.

The S.A. Broadcasting Corp. has installed a 16mm film unit which is used

for publicity purposes and for producing television films in South Africa for the Australian Broadcasting Corp.

Jamie Uys Film Productions of South Africa is headed by Jamie Uys, the South African genius who produces excellent films for the Afrikaans communities and has one or two overseas awards to his credit. The firm's production facilities uses Arri equipment.

The number of drive-in theaters is increasing. Most equipment is imported for exhibition purposes while much of the amplification equipment and loud-speaker casings are manufactured in South Africa, mainly because of the severe import control.

Amateur motion-picture equipment sold in South Africa comes from all over the world, United States, Italy, France, Japan, Australia, Hungary, Germany, Yugoslavia and Poland, but no equipment of this kind is manufactured in South Africa.

George Michael Films of Pretoria produce regular television series for the United States and Great Britain based on animal and tribal life in South Africa.

Alfa Film Productions of Johannesburg produce mainly 35mm film advertisements and are best equipped for animation. The firm plans to install color processing equipment.

Australia

With the introduction of TV in Melbourne and Sydney, the use of adver-



Fig. 43. The 330-w d-c power supply unit beside a Bell & Howell Printer.

tising and episode films has increased enough to bring out every budding producer and cameraman. At the end of this year most of the backyard producers will have disappeared from the commercial scene and all the work will be handled by the established and well-equipped film producers.

In Melbourne one large studio is working to capacity on TV shorts and commercials. They are now branching out into half-hour serials. Stanley Kramer is producing *On The Beach* with Ava Gardner, Gregory Peck and company. General Motors, Chrysler and Ford are all producing films of their products.

Sydney studios have been generally occupied with TV production. Only one laboratory and production unit has really extended its operation by installing new machinery, such as Arri printers, Arri cameras and an Arri silver recovery plant. Their Eastman-color film processing plant is now in operation.

Leslie Norman is directing *The Summer of the 17th Doll* for Hecht and Lancaster and a British company has produced *The Siege of Pinchgut* in Sydney Harbour. Pagewood Studios are being occupied most of the time by overseas producers, used as offices and headquarters and for large interior work.

The coming year will see quite a change in number of studios available, advent of new equipment, and increased production. Several executives are planning trips abroad to investigate new production methods, equipment and lab management.

The United States is losing out on equipping of studios. German cameras and equipment are replacing all American equipment. The Germans are giving service and are after the business. Even recording equipment is predominately German. As far as styling is concerned, an Australian style has been evolved with a fair amount of American and European influence.

Difficulties have been experienced with channel 2 (National Station) due to the choice of intermediate frequency (sound, 30.5 mc; vision, 36 mc) a beat pattern

can be observed when tuned to channel 2 (vision, 64.25 mc; sound, 69.75 mc). Talks with the Australian Broadcasting Control Board are in progress on the subject of lessening the effect. A possible solution is to shift the intermediate frequency adopted by the industry.

The year saw the first long-distance telecast of a remote event when ATN-Sydney covered important functions associated with the visit of the Queen Mother to Canberra, which is 200 miles from the ATN Studios in Sydney. The remote telecast was undertaken using mobile link equipment at two repeater points and attracted great interest. Also in the year video tape was introduced in Australia when the first unit installed was modified and used with great success on the Australian (CCIR) system, at ATN Sydney.

During the year, revised Standards (Standards for the Technical Equipment and Operation of Television Stations; Australian Broadcasting Control Board, Melbourne) covering the technical equipment and operation with TV studios were promulgated. The Standards incorporate separate minimum transient-response performances for transmitter, studio and microwave link equipment. The transient-response performance is based on the distortion during transmission of a step function with maximum tolerances stated for departure from the ideal for each application.

Television in 1958 was the second year of operations for the one National and two Commercial Television stations established in each of the two largest cities, Sydney and Melbourne. All of the stations increased their program-hours from 30 to 44 per week at the beginning of the year to as many as 83 hours per week at the end of the year.

The number of television receivers in use in the Sydney and Melbourne areas more than doubled during the year with more than 500,000 in use at the end of 1958. It is noteworthy that the vast majority of Australian television receivers employ d-c coupled video output circuitry.

Philips Electrical Industries Pty. Ltd., one of the large receiver manufacturers, state that as far as they are concerned the year 1958 has been one of consolidation in their TV receiver design and production. The same basic chassis has been used for their range of models, but improvements have been introduced to cope with peculiar Australian conditions, such as low mains voltages at the end of long mains lines and "bouncing" mains voltages. Temperature compensation has been introduced in the vertical deflection circuits to prevent the picture shrinking after the set has warmed up. This is accomplished by means of a negative temperature coefficient resistor in the vertical deflection coil.

The 70° deflection picture tube is no longer offered and even the 90° tubes are being partially replaced by 110° tubes. The 17-in. picture tube has lost ground considerably and the 21-in. is gaining. It has been found that the standards for transient response, which demand a high degree of performance, can be realized in practice with commercially available equipment, and that compliance with the standards produces a high standard of picture quality which can be readily appreciated on commercially produced receivers.

Plans for the extension of television services to new areas were taken a step further by the authorization of new stations in the State Capitals of Brisbane, Queensland; Adelaide, South Australia; Perth, Western Australia; and Hobart, Tasmania. Brisbane and Adelaide will each have two privately owned commercial and one Australian Broadcasting Commission (Government) noncommercial stations. Perth and Hobart will each have one A.B.C. and one commercial station.

All of the new stations are expected to start operations during 1959 or early 1960. This will make television services available to a population of approximately 6 million. Plans for a new factory have been announced by Eastman Kodak Co. The film manufacturing division is expected to be completed in about 18 months and the entire factory will be completed within five to seven years. Employment of about 2500 persons is anticipated.¹⁸⁵

Canada

Comparatively few technical developments were introduced during 1958, but indications are that there will be more to report next year.

A 330-w d-c power supply unit manufactured in Winnipeg possesses less than 1% ripple voltage. Figure 43 shows the unit beside a Bell & Howell printer in the Michel J. Sym Studios in Winnipeg.

At the National Film Board of Canada the various departments built many items of equipment and modified others. Two items to be mentioned: a tape-to-projector interlock, and a ripple filter for an 800-amp d-c generator.

To facilitate interlock between 16mm projectors and 16mm magnetic sound tape a selsyn drive was applied to the projector, with the selsyn generator mechanically coupled with a rubber timing belt to the tape machine motor. The projector now runs in perfect sync with magnetic tape on a 16mm Sprocket-tape unit¹⁸⁶ mounted beneath the projector. This method of interlock is reliable and inexpensive.

The 800-amp, 120-v d-c generator used to supply lighting on the shooting stage has in its output a 1000-cycle tooth ripple which can produce a clearly audible tone from arc lamps. To over-

come this the staff designed and constructed a 1-kc filter which reduces the ripple to negligible proportions. Figure 44 shows the whole unit attached to the side of a circuit breaker. Figure 45 is a close-up of the compact choke.

Shelly Film of Toronto announced an expansion program throughout its activities.

Canadian TV broadcasting in the past year was highlighted by two events: the inauguration of the coast-to-coast microwave network and the opening of the video-tape time-delay center at Calgary on July 1 (Dominion Day).

The world's longest microwave system, 3900 miles from the Atlantic to the Pacific, was completed by the Trans-Canada Telephone System in time to carry a special program commemorating the 91st anniversary of Confederation. The new "skyway" comprises 139 relay stations with a number of spur lines. Canadian Pacific Communications and Canadian National Telegraphy jointly provide additional transmission facilities for the French network in Quebec and cities in southwestern Ontario.

The \$50 million coast-to-coast microwave project was started in 1955. In the western Alberta and British Columbia section, 10 of the 13 relay stations are on mountain tops, the highest 6700 ft above sea level. Two aerial tramways had to be built, the two-mile-long tramway at Dog Mountain in British Columbia being one of the biggest in the world. For the first time live television is now within reach of 3 million Canadian homes and 80% of the population. Work is in progress to extend the network to Newfoundland. From Sydney, N.S., microwave towers on Cape Smokey in Cape Breton Highland's National Park, and the 1400-ft summit of Cape North, at the northernmost tip of Nova Scotia, will carry programs across Cabot Strait, a 70-mile hop to Red Rocks on the Newfoundland shore. When this link is completed in 1959, a network 4200 miles in length will join Victoria, B.C., with St. John's, Nfld.

As a part of the Dominion Day ceremonies, the video-tape time-delay center at Calgary was also inaugurated. Equipped at a cost of \$700,000, the center provides seven video-tape units and two film camera chains to overcome the problems of six time zones in the operation of the national network. Programs originating at the major production centers in Eastern Canada are recorded in Calgary, and re-transmitted two hours later to the Western section of the network. After an additional one-hour delay a second transmission is made for the Pacific Time Zone.

With the completion in sight of network facilities linking Canada's ten provinces, attention is being directed to

the rapidly developing expanses of Northern Canada. On June 1, the Bell Telephone Co. and the Quebec Telephone Corp. opened a tropospheric scatter microwave system serving the Knob Lake and Goose Bay areas in Northern Quebec and Labrador. Normal microwave facilities are being used to link Flin Flon, Man., with Winnipeg, and the Peace River Area in Alberta with Edmonton.

Canada's 91st birthday on July 1, 1958, coincided with the 350th anniversary of the founding of Quebec City, and the 100th anniversary of Ottawa as the capital city. For the inauguration of the coast-to-coast network 40 TV cameras were used, linking Halifax, St. John (N.B.), Quebec City, Montreal, Ottawa, Toronto, Niagara Falls, Winnipeg, Saskatoon, Regina, Edmonton, Calgary, Vancouver and Victoria.

There are now 50 TV stations in Canada, eight of which are owned and operated by CBC, 40 are privately owned, and two are operated by the U.S. Air Force under CBC management.

Network Services: CBC operates two TV program services, a French network centered in Montreal, and an English network with the major production center in Toronto. The French network provides an average of 140 telecasts per week, 110 of which are live Canadian programs. The Montreal studios rank third in the world after New York and Hollywood in live TV production. In the English network service, 60% of the programs are produced in Canada, the remainder being brought into the country via a microwave link with U.S. networks at Buffalo, or originating from film. Total CBC French and English production is greater than that of any other TV system in the world, on a total budget less than one-fifth of either of the two major U.S. networks.

In six years of development under the Canadian system of privately and publicly owned partnership, Canadians have spent over one billion dollars for receiving sets. In the fiscal year 1957-58 Canadian advertisers spent \$40 million in TV, and \$33 million of public funds was required to support the National TV service.

At the close of 1958, Canadian television entered a new phase of development with the appointment by the government of a Board of Broadcast Governors, which will regulate all broadcasting activities in Canada. A new board of directors has been set up to administer operations of the CBC, with J. A. Ouimet, former CBC General Manager, as president. These steps were taken as a result of recommendations by a Royal Commission published in March 1957 after an extensive study of broadcasting in Canada.



Fig. 44. Filter mounted on the side of a circuit breaker.

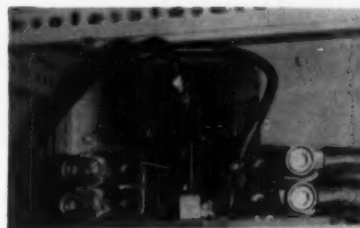


Fig. 45. Filter choke (1-kc) for 800-amp., 120-vd-c generator.

New Studio Facilities: Two new CBC studios were completed during the year, one at Montreal and the other at Toronto, with similar facilities in both studios. The studio in Toronto has been equipped with four Marconi Mark III cameras, utilizing $4\frac{1}{2}$ -in. image-orthicon tubes. Studio 42 in Montreal is similarly equipped except that 3-in. Type 5820 tubes are used.

A Type VM-3 switcher has been installed consisting of a Philco crossbar video switch and associated control panel designed and built by CBC to meet special operational requirements.

The vision mixer accepts video signals from a maximum of 12 sources and provides a single output to line by cutting, mixing or fading from one source to another. In addition two sources can be superimposed, and cuts, mixes and fades can be made to or from any other source or superimposition of sources. It is also possible to superimpose four sources and to cut to or from any other source. In this way a continuous output can be built up for distribution and transmission to line. Provision has been made for instantaneous selection of either synchronous or nonsynchronous operation of any of the twelve inputs.

Preview facilities have been incorporated to permit previewing of any source or superimposition of sources before transmission to line or the transmission itself. Control position monitoring facilities consist of a high-quality video monitor and a Tektronics 525 scope terminating the preview bus.



Fig. 46. Lighting control board in Studio 7, Toronto. Preset controls containing dimmer positioner are at left and right; control console at rear.

Toronto Studio 7 — TV Lighting Control: A 10-Scene Preset Lighting Control Switchboard has been designed and engineered by CBC, and manufactured by Kliegl Bros., New York (Fig. 46). This switchboard controls 24 10-kw Ward Leonard Magnetic Amplifier Dimmers (Fig. 47) and several special-effects dimmers of varying capacity.

Each 10-kw dimmer is provided with 10 individual dimmer positions, one for each scene, making a total of 240 positioners. These dimmer positioners are manufactured by Strand Electric of Great Britain.

The switchboard is divided into three units consisting of a center control console and two side units each containing 120 dimmer positioners. The center console, which is the operating console, contains the Scene Master, Scene Selector Panel, special-effects lighting controls, and controls for non-dim circuits and utility circuits.

The switchboard is equipped with 20 Scene Master controls arranged two per scene, and termed A and B, respectively. These Scene Master controls are equal in all respects, and dimmer positioners may be switched to either the A or B Scene Master by the operation of individual 3-position switches, "on-off-on," which are part of each dimmer positioner unit.

Scenes required "on air" are selected by pushbuttons located on the scene selector panel. This panel is a 3-bus unit with two live bus bars (termed X and Y, respectively) and one cancellation bus. Potential is fed to the live bus bar by a master fader unit, and proportional fades between each bus are obtained by the operation of the Master Fader (called X-Y Fader).

By the operation of the Scene Selector pushbuttons any scene may be punched "on air" instantaneously, scenes may be piled on together thereby adding groups of light to the scene, and by the operation of the scene-cancel buttons individual scenes may be dropped instantaneously out of circuit. These actions may be performed on either bus. Slow proportional fades between groups of lights switched to either bus are obtained by operating the Master Fader.

Connections to the dimmers are effected by a Patch Panel designed and manufactured by Kliegl Bros. This contains 516 20-amp circuits and 114 50-amp of which 414 20-amp and 24 50-amp are wired for black-and-white TV operations. This is a cold-patch board, and every circuit is equipped with an individual circuit breaker which mechanically interlocks with the male plug, thereby preventing the possibility of "hot plugging."

During the 1958-59 season, four episodes of one-hour drama originating in Studio 7, Toronto, were taken on the microwave network by ABC and distributed live in the U.S.

Tests and Controls: A staircase test slide has been developed to produce a linear crossed staircase display on the waveform monitor when the camera chain is correctly aligned. The maximum density of the wedges is 1.85; minimum density, 0.25; and the background is 0.80. These slides are now commercially available with a tolerance on the maximum density of ± 0.05 and on the minimum density, ± 0.02 . A window slide for setting beam current has also been developed consisting of a 0.10 neutral



Fig. 47. 10-kw Ward Leonard magnetic amplifier dimmer bank, Studio 7, Toronto.

density filter in which three rectangular windows are cut out.

Equipment can be set up with these slides in a reproducible manner, and used for the evaluation of the suitability of materials supplied for telecasting. As a result of extensive investigations of the causes of poor sound and picture quality of TV film, the conclusion has been reached that standardization of motion-picture laboratory practices is essential. A subcommittee has been set up, sponsored by the Canadian Section of the Society, to study these problems and considerable progress has already been made, particularly in the areas of sensitometer, densitometer and printer standardization. The National Film Board is the official working agency for the subcommittee.

Recording and Distribution: TV recording operations, concentrated mainly at the English and French network centers in Toronto and Montreal, have not as yet been affected to any extent by the installation of the video-tape delay center at Calgary. As the pattern of Canadian broadcasting changes, new uses are being found for TV recordings. One of these is the export market.

The kinerecording installation at Montreal has been redesigned and additional printing and processing facilities have been provided, including Reeves PVR 100 magnetic sound recording and playback units, Reeves LAB16 electrical sound printers and Bell & Howell Model J picture printers.

Thirty-nine episodes of a current one-hour drama series have been sold in the United Kingdom. In addition to this series, a one-hour program and 12 half-hour programs have gone to Australia, and four one-hour and 26 half-hour dramas to the B.B.C. An export market for full-length film programs produced by CBC is also being developed. During 1958, 27 programs of this type were sold in the United Kingdom and one in Holland.

Technical Facilities: A pulse clock system, designed and engineered by CBC, has been installed at Halifax, Toronto

and Vancouver. A 7000-mc transmitter link has been completed at Vancouver. Additional vidicon telecine equipment has been installed at Montreal, Toronto and Ottawa. The new chain at Montreal is equipped with Reeves MDB 100 magnetic interlocked playback units. Studio 1 at Toronto has been completely rebuilt, and fitted with Marconi Mark II camera chains and CBC Vision Mixer VM3. A one-camera studio has been completed at Halifax.

Satellite Transmitters: On November 24, 1958, low-power satellite transmitters went into operation in Liverpool and Shelburne, N.S., and on December 20, in Yarmouth, completing the first three-station system of its kind in Canada. The system in use along Nova Scotia's south shore works this way: The Liverpool satellite, 67 air miles from Halifax, is located at Great Hill, 300 ft above sea level (Fig. 48). The signal is picked up with a high-gain antenna, and retransmitted on another channel. It is then picked up by the next satellite translator at Shelburne, retransmitted on yet another channel to the third satellite at Yarmouth. The distance from Liverpool to Shelburne is 36 miles, and from Shelburne to Yarmouth 38 miles.

The satellite buildings are based on designs used in the Arctic. Each building, prefabricated and thoroughly insulated, is approximately 10 by 12 ft and is electrically heated with a standby propane unit.

The three satellites were scheduled to begin operation on November 24. Liverpool on Channel 12, Shelburne on Channel 8 and Yarmouth on Channel 13; however, a U.S.A. station did change from Channel 13 to 12 as anticipated and equipment had to be purchased for Yarmouth on Channel 11.

Chinese Peoples Republic

It has been very difficult to obtain the latest information about the progress made by the Chinese Film Industry. Efforts to obtain information directly or through consular channels have not been successful. Most of this report is based on information supplied by Sree M. Bhavanani, a leading Indian producer of documentaries and ex-chief of the Government of India Films Division. He has recently returned after a three months tour of China during which he has been successful in exposing over fifty thousand feet of film.

According to Mr. Bhavanani, there are now over 2000 permanent cinemas in China — mostly in the bigger cities; while the rest of the country is believed to be catered to largely by touring cinemas.

Production activity is centered mainly at Peking, Changchun, Shanghai, and to some extent in Canton; but cameramen are stationed all over the country to

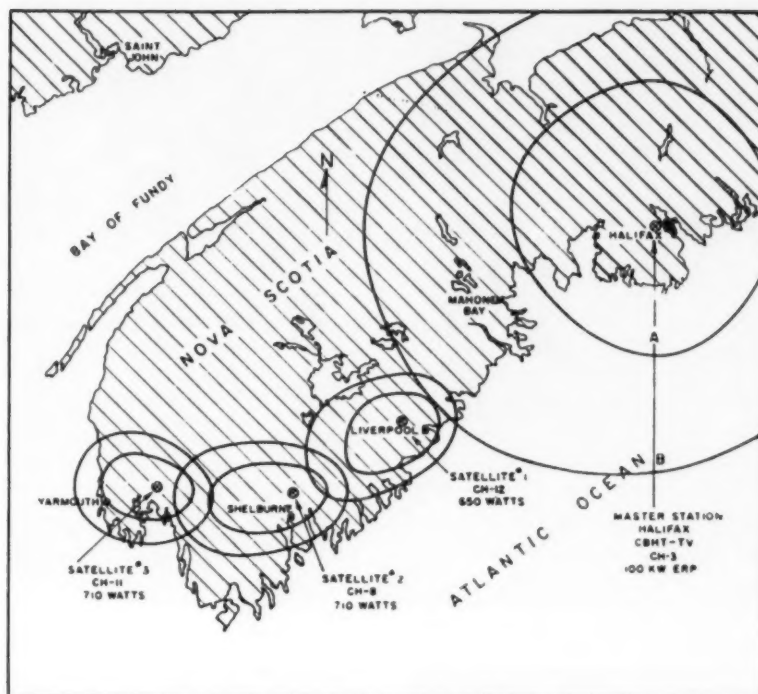


Fig. 48. Satellite system along the south shore of Nova Scotia.

cover news and other items. There are plans to build new studios at Hurhet, Sinkiang and Canton.

A puppet and cartoon film center is operated at Shanghai; however, the animation chiefly of the puppet films did not impress Mr. Bhavanani very much. The standard of drawing, however, in the cartoon films is high.

Studios everywhere have their own laboratories; and the technical work turned out was praiseworthy. Special mention in this connection has to be made of the hand laboratory at Canton which was competing very successfully with machines with which other centers were equipped. A new and up-to-date laboratory for both black-and-white and color has recently been put up at Peking. The equipment is of Czechoslovakian origin.

There is a factory at Nanking which was originally producing 16mm projectors in large numbers. This has now been enlarged to produce 35mm projectors and cameras. The cameras resembled in appearance the well-known German Arriflex. Blimped versions of these cameras were also being used in the studios. The factory was also manufacturing editing equipment such as tables, etc. Equipment of the type of the American Moviolas was not popular and hence was not being produced. Lighting equipment of local manufacture was also very much in evidence, presumably made at the Nanking factory.

Since the last report no progress seems to have been made in any extended use

of such modern aids to production as the back-projection system or the optical printer; but 35mm magnetic tape recording is fast replacing photographic recording.

There are two television transmitters, one at Peking and the other at Shanghai.

The general technical quality of films produced, as has already been stated, is of a high order — while the histrionics displayed by Chinese actors and actresses is praiseworthy. Great stress is laid on realism, which, combined with the total absence of "stars" gives an almost documentary impression of even carefully staged subjects. The realistic filming of war scenes seems to be a speciality of Chinese studios.

The contents of all films are, of course, mainly educational and communist propaganda; but within these limitations full scope is given, and more than often utilized, by young directors.

The total number of features produced does not appear to be very high. Exact figures were difficult to obtain, but Mr. Bhavanani places the figure at about 25. To supplement these, quite a large number of films from the Soviet Union were being dubbed into Chinese and shown at regular theaters. The Indian film *Pather Panchali* was also being dubbed but has so far not been released. It would be interesting for Indian readers to note that China unlike other Eastern countries does not favor lengthy films. Some of the recent Indian films exported into the country have been shown in two and even three installments.



Fig. 49. The André Debie motion-picture camera for telecontrol system.

On being questioned as to the possibility of production of the pure entertainment type of picture, a Chinese spokesman was reputed to have said that undoubtedly they would do so but for the present China had more important work to do, and was intent in harnessing all its resources, including the cinema, into the development of the nation.

At the same time, although the production of the pure entertainment type of picture was denied in China, it has been reported by film producers in Singapore that China does produce such films, but solely for export. As a matter of fact, the statement signified that these Chinese releases were providing an extremely stiff competition to local Malayan films, so much so that producers were highly perturbed. However, we must not forget that films in the Chinese languages are also produced in places other than China, and it is probably these films which are reported to be flooding the markets in the Chinese speaking Far East countries.

In addition to the above some reports reached the United States that China had entered into the export field in radio, TV and electronics, through its state-owned China National Instruments Import Corp. Prices on low-power transmitter tubes (400 w), manufactured by the Nanking Electron Tube Factory, were reported to be "very low."¹⁸⁴

Egypt

There is relatively little new to report in the field of motion pictures for this year, except that there will be in the near future a new building, located beside the old building of the Misr Studios. The new building will be well constructed and will be complete even to air conditioning. Another new building

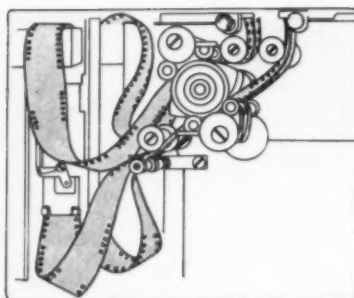


Fig. 50. The Camé-Twin 35mm two-film camera system for optical effects.

will house a motion-picture laboratory. (The old laboratory was illustrated and the Misr Studios described in some detail in last year's report, May 1958 *Journal*, pp. 316-317.)

Total production for all Egyptian studios reached eighty features and about twenty shorts. This does not include the newsreels.

France

Lenses: A new interchangeable anamorphic lens, focused by rotation on a graduated scale, has been announced by the Société d'Application Technique et d'Exploitation Cinématographique (S.A.T.E.C.-Dyaliscope). An anamorphic lens made by Franscope can be attached to existing lenses of 50mm focal length or more. Focusing is done with the anamorphic lens only, the basic lens being held at infinity.

Kinoptik has a new lens, suitable for 16mm motion-picture or television cameras, the characteristics of which are a wide angle and large aperture. The focal length of 5.7 mm gives a distortion-free field of 120°. Based on studies made by the French Optical Institute, this lens

balances variations in luminance at the extremes of the image.

The French Optical Institute is studying the possibilities of different ways of filtering to obtain better results from old or grainy negatives.

Cameras: In general, trends in camera development have been toward greater automaticity and telecontrol. Variable-focus lenses, e.g. the Pan Cinor of SOM Berthiot, are used with increasing frequency in motion-picture production.

André Debie has a new system permitting telecontrol of the scenes being photographed by transmitting them through a video system to a television screen on which the director or cameraman can observe a picture 40 cm wide, corresponding to the scene before the camera (Fig. 49). Focus is remotely controlled. A flying-spot scanner measures luminance at various points on the image so as to maintain correct balance within exposure limits. The system is based on a special type of shutter formed of two light-reflecting blades.

The Camé-Twin is a 35mm camera, made by Eclair, in which a split-beam image is directed onto two films driven in synchronism (Fig. 50). This camera is intended for optical-effects work and especially for traveling-matte photography.¹⁸⁵

A new 16mm camera with reflex viewfinder came from Beaulieu during the year, while Ercsam produced an 8mm camera, also with reflex viewfinder.

Printing and Processing Equipment: A new Debie "Aiglone" machine for the processing of 16mm reversal film was put on the market, and another Debie processor for Ektachrome was expected. Debie also announced a new 35/16 color reduction printer.

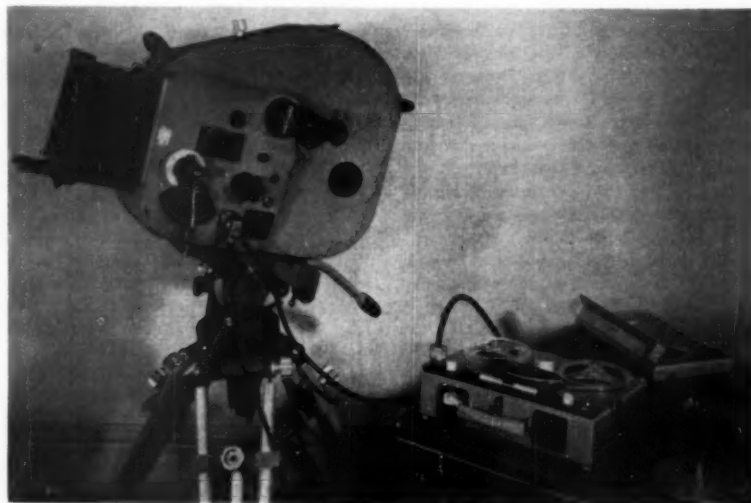


Fig. 51. Eclair portable recording system: blimped Camerette and Perfectone magnetic recorder.

A new optical printer for special effects was developed by L. Lax.

Sound Recording: Eclair brought out a portable recording system consisting of a blimped Camerette camera with a Perfection (Swiss) portable magnetic recorder (Fig. 51). This system was described briefly in the *Journal*.¹⁰⁶

Projection: A new 16mm projector developed by Erksam is adjustable for 8mm or 9.5mm film. A 16mm magnetic sound projector for professional and television purposes was announced by André Debré.

Germany

Television Studio Techniques: In 1958 existing equipment was further developed and improved. Newly introduced were pulse diverters and a time-delay correction device with transistors (Fernseh GmbH., Darmstadt). Further developments have been made toward the transistorization of video equipment at the Institut für Rundfunktechnik (IRT). The necessary drift-transistor types are now obtainable in the German Federal Republic; nevertheless, the introduction of transistors in studio techniques is not yet general.

Most broadcasting corporations are planning to extend studio capacity in order to increase program-hours and to establish a second TV program within the next few years.

TV Cameras: Developments in lighting and air-conditioning equipment for the proposed new studios will depend on the sensitivity of the TV camera types to be used. After preliminary tests at the covering resolution, signal-to-noise ratio, permissible contrast range and required light intensity of the camera tubes offered, several test-cameras have been built with the English CPS-Emitron camera tubes made by EMI Ltd. and the 4½-in. superorthicon of English Electric Valve Co., Ltd. These cameras will be tested in TV studios in order to determine to what extent they are likely to be introduced into German studios in addition to the supericonoscope and 3-in. superorthicon cameras already in use.

Two new camera chains, based on the light superorthicon camera described in last year's report, came from Fernseh GmbH. One of these (Fig. 52) is portable and intended for outside use; the other is for studio installation. A transistorized intercom system facilitates coordination of the various parts.

Measurement Techniques: Extensive trials of the line-test techniques for control of transmission lines referred to in the preceding report have been concluded. The line test has become a valuable check on transmission characteristics during the broadcast. An equipment has been de-

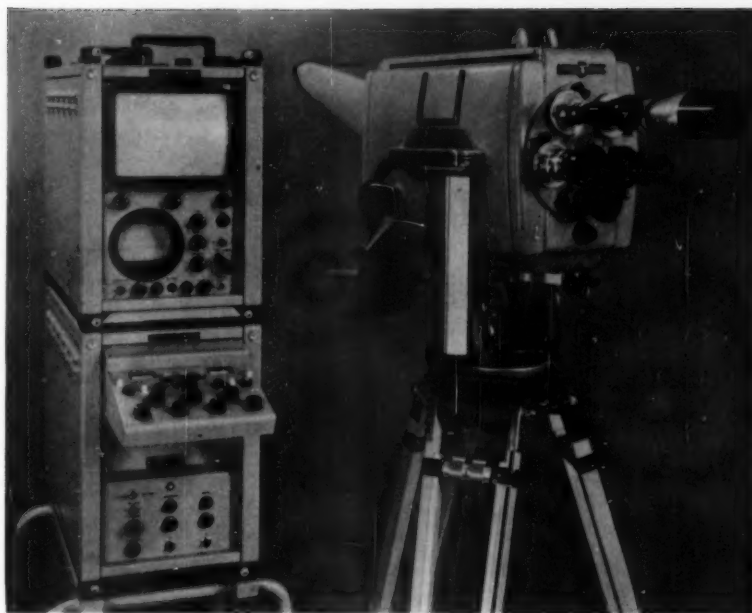


Fig. 52. Portable Camera Chain (Fernseh).

signed (IRT) which allows automatic regulation of the input level of television transmitters by means of the white level line contained in the test-signal. Thus a constant reference value is available at the TV transmitter, independent of intentional or unintentional variations of the white level during the program. Moreover, extensive tests have been performed with a "frequency-response line test" which permits the control of the frequency response of a transmission line by the same method.

Video-tape Recording: The first Ampex Videotape recorders have been introduced into service after adaptation to the CCIR-standard by Siemens & Halske, Karlsruhe. First test transmissions have been carried out already at the Südwestfunk, Bayerischer Rundfunk and NWRV. The equipment does not yet meet all requirements of the 625-line standard with regard to correct playback frequency response. Moreover, instability of the playback signal causes horizontal deviations of the image in receivers with fly-wheel synchronization. Ampex is at work on this problem.

Wireless Microphone: The action range of the announcer during a public transmission is limited by the microphone cable. Encouraging results were obtained at several studios using a small wireless microphone with FM-transmitter the size of a well-filled pocketbook. A wireless microphone is now available (Sennheiser Electronic, Bissendorf/Hann.), its amplifier and transmitter being equipped with transistors. The carrier-frequency is 37 mc, the deviation frequency at normal output is ± 40 kc. First operational tests



Fig. 53. Sennheiser Electronic Wireless Microphone.

have been successful. It is proposed to provide the amplifier with compression characteristics in order to maintain acoustical balance in improved dialogues (Fig. 53).

TV Film Technique: For newsreel production, the pilot frequency method is generally used for outside film recordings and interviews with synchronous sound, as reported last year. The new model of the Arriflex 16 is the most frequently used camera for this purpose. It has been provided with a pilot frequency generator (Fig. 54) and automatically puts a start mark on the picture film and on the magnetic tape of the sound recorder simultaneously. The start mark is imposed by exposure of the first few frames of the film during the acceleration of the

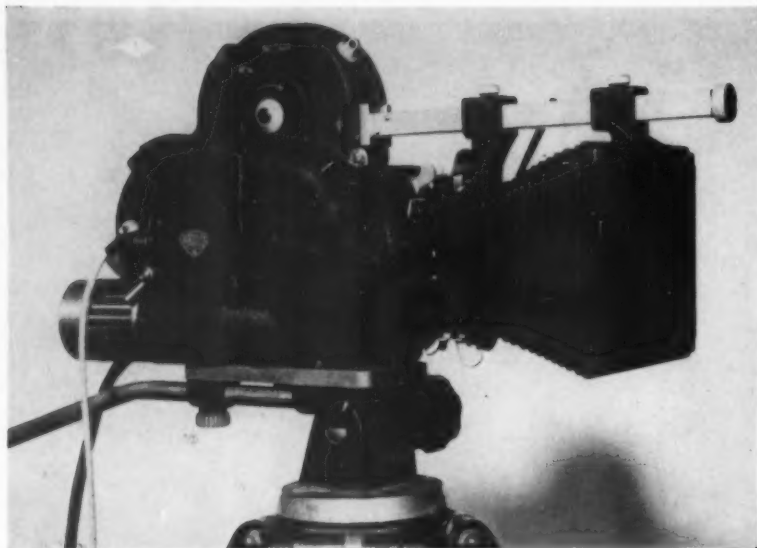


Fig. 34. Arriflex 16mm camera with pilot frequency generator and automatic cue-marking device.

camera by a small lamp above the film window and by delayed connection of the pilot frequency with the magnetic-tape recorder. This is effected by means of a small relay which switches off the exposure lamp and simultaneously switches on the pilot frequency to the magnetic tape when the standard film speed of the camera is achieved. In re-recording, the start mark on the magnetic tape is transferred to an auxiliary track of the magnetic film, thus facilitating synchronization work on the editing table. In the new-model 16mm sound-film editing machine (W. Steen-

beck, Hamburg) used for television, the mechanism stops automatically when arriving at the start mark.

A new drive mechanism for magnetic film recorders has been developed which operates by friction drive like an ordinary tape recorder. Synchronism with the camera (50 cycles and 25 frames/sec), is attained by scanning the perforation frequency of the magnetic film with a photocell and comparing it with the frequency of the power supply. An automatic frequency-control unit affects the impedance tube of a 50-cycle frequency generator by means of a phase bridge, so

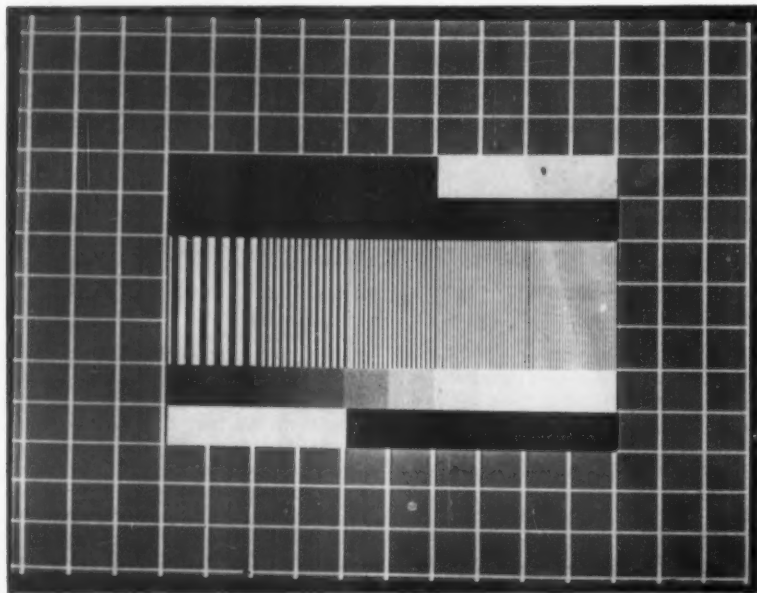


Fig. 36. Telerecording of an electronic test pattern on 35mm reversal film (IRT).



Fig. 35. 16mm magnetic film recorder with friction drive and perforation-frequency speed control (Telefunken).

that its amplified frequency accelerates or delays the motor of the tape playback mechanism until perforation frequency and power supply are in phase. The new magnetic film machine has the great advantage of a short starting time without any danger of damaging the perforation and with the possibility of fast rewinding like a standard magnetic-sound recorder. The production of this equipment will begin in the spring of 1959 at Telefunken GmbH, Hamburg-Wedel (Fig. 35).

As reported last year, photographic recording in German television is done by the suppressed-frame method on 16mm reversal film. CCIR-standard quality in live transmission cannot be maintained with this method of film recording. Tests have been made, therefore, to determine whether a photographic recording of consistently high quality can be made on 35mm film. Figure 36 shows the result of a 35mm film recording of an electronic test pattern generator with gray scale and sinus-generator 1 to 5 mc. The consequent development of a 35mm camera with a fast pulldown mechanism of 2 msec for full-frame recording is to be undertaken. Industry experience with video-tape recording will show whether it can meet requirements with regard to picture quality, reproduction after prolonged storage and editing.

TV Microscopy: In a new TV microscope announced by Siemens & Halske the Zeiss Standard WL research microscope and Siemens & Halske industrial TV equipment have been combined. Special structural elements of the microscope project the image which is to be transmitted upon a vidicon-camera tube, where it is scanned for TV transmission. In the reconversion of the signals into a visible image on the receiving screen, the electronic signal amplification produces light amplification of the screen image compared to the original image produced by the microscope. This light amplification reduces the need for bright illumination of the specimen and thus permits the microscopy of sensitive biological preparations.

Film Scanning: The Vidicon film scanner made by Fernseh GmbH has been provided with the automatic light flux control referred to in last year's report.

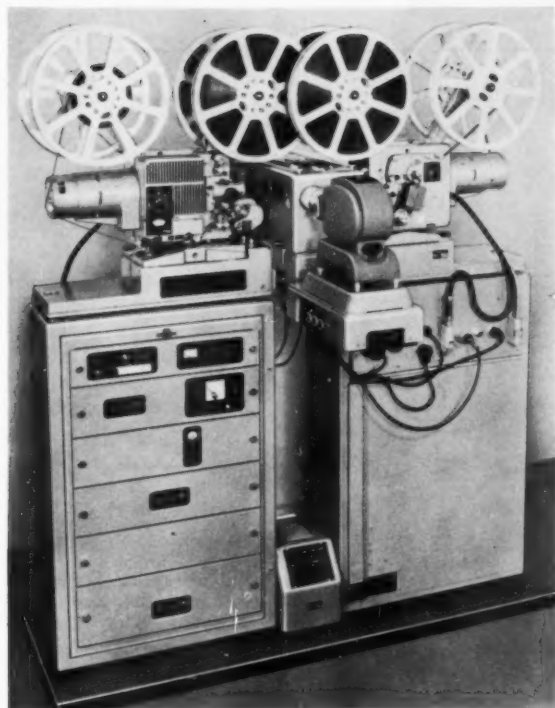


Fig. 57. 16/16mm multiplexer with vidicon camera chain (Siemens & Halske).

The light intensity of the projection lamp is controlled by a transducer system, regulated by the output signal of the vidicon.

Siemens & Halske has a studio double-system projector-type multiplexer for continuous transmission of 16mm sound film and slides by means of a TV camera. The equipment consists of two studio double-system projectors 16/16 and a slide projector (Fig. 57). All three

projectors project the image into a vidicon camera by way of a mirror system (Fig. 58).

Fernseh GmbH makes an optical multiplexer with up to six inputs for manual or remote control (Fig. 59).

Other TV Activities: Test service with transmitters operating on a fourth channel has been started already by several broadcasting companies. Detailed in-



Fig. 58. Multiplexer light path selector (Siemens & Halske).

vestigations of the precision carrier offset (line and picture frequency) have been made and tested by experimental transmissions in connection with the planning of new TV transmitters. An improvement in the interference ratio of about 10 db was obtained. During the period of the report a 2 million total of TV receivers registered at the Deutsche Bundespost was exceeded. The output of the Western-German receiver industry is more than 1 million per year at the moment.

In industrial television, increased use and specialization can be reported. The equipment has been improved considerably, especially in the direction of automatic operation.

Difficulties arising from the use of the superorthicon led Fernseh GmbH to develop a vidicon-tube converter capable of converting any of the three standards currently in use in Europe (Fig. 60).

The introduction of color television in the German Federal Republic is still

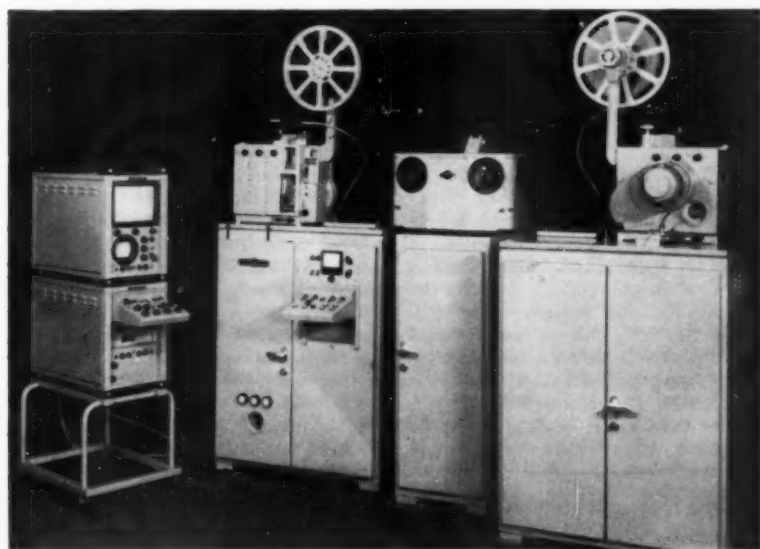


Fig. 59. Multiplexer (Fernseh).

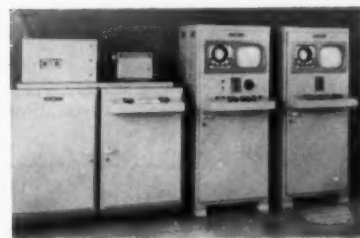


Fig. 60. Standards converter (Fernseh).



Fig. 61. FP 20-S Projector with SPP 800 lamp (Philips).

indefinite. Planning and development have been continued.

Motion Pictures: Up to now most of the larger film projectors were designed for carbon-arc operation. The present advanced development of gas-discharge lamps has resulted in types suitable for film projectors. Philips in Holland have developed a special type for this purpose that has been tested for two years with good results in a medium-sized theater.

This gas-discharge lamp SPP consists of a quartz tube of 80mm length and a maximum diameter of 5.6 mm — volume a few mm, which makes an extremely small lamp. The discharge takes place inside a thin capillary tube with an arc length of about 17 mm. For film projection the lamp is driven by a pulsating direct current of 72 pulses/sec or 3 pulses/frame. Light is produced only during these current impulses; in the intervals the lamp is dark. This lamp finally fulfills the old dream of the cinema technicians: to be able to produce light only as long as it is necessary for actual pro-

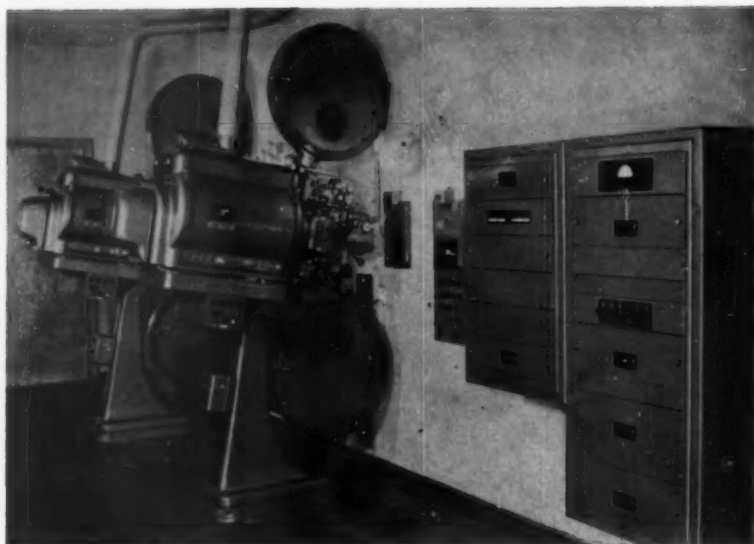


Fig. 62. Euromat automatic projection system (Siemens & Halske). From right: optical and 4-channel magnetic sound amplifier, Euromat automatic projection equipment, two Bauer B 11 projectors.

jection, thus cutting the losses caused by the rotary shutter.

The SPP lamp can be loaded up to 800 w. The average life of this inexpensive lamp is 33 working hours under full load. At lower loads, however, the working life is considerably extended.

Unlike the case with incandescent or carbon-arc lamps, the luminous flux decreases no more than proportionally with the load, so that the luminous efficiency remains equally high. The extremely high current intensity during the impulse peaks at which values ten times the mean value are reached, leads to a continuously uniform spectral-energy distribution, permitting excellent projection of color film. Both according to the way it is produced and to its spectral distribution, the light can be classified as "cold" light, so that the film is hardly heated. Ultraviolet radiation is eliminated by an absorption filter contained in the lamp holder.

The luminous flux of each individual lamp remains constant throughout its life. Only just before its ultimate breakdown the luminous flux shows a pronounced deterioration. The excellent properties of this gas-discharge lamp can only be fully utilized in a specially designed, shutterless projector (Fig. 61). Without entering into the constructional details of this projector, a brief description of the working of the lamp and how it is utilized in the projector follows.

Since the lamp is small and may be placed without any risk in the immediate

vicinity of the picture gate, its optical system can likewise be small. It consists of a cylindrical reflector not larger than 11 by 9mm and two lenses, which form an image of the discharge in the objective lens. This explains the exceptionally high side-to-center ratio of 95%. Every frame of the film receives three flashes when stationary. Even for a picture brightness of twice the value of that now possible with carbon-arc or xenon lamps the picture shows no trace of flickering. The film is moved up while the lamp is completely dark. A projector equipped with this lamp accordingly does not require a rotary shutter and all light produced is completely utilized for projection.

The SPP lamp operated at 800 w produces the same luminous flux on the screen as a high-intensity arc lamp at a current of 60 amp. This is sufficient even for the larger cinemas. The screen sizes attainable on a matte-white projection screen with a reflection factor of 0.8, on a screen with an average angle of vision with a reflection factor of 1.8 and on a narrow-angle screen with a reflection factor of 3.0 with the aid of a projection lens of 1:1.8, are given in the following table. Strongly reflecting screens, e.g. beaded screens, owing to their narrow angle of vision, are obviously unsuitable for large cinemas. This should be kept in mind when consulting the tabulated data below.

Maximum screen sizes in meters for standard luminous intensity:

Aspect ratio	Standard	Wide-Screen	CinemaScope
	1:1.37	1:1.85	1:2.34
Matte-white.....Q = 0.8	8 × 5.8	8 × 4.3	10.5 × 4.5
Average angle of vision.....Q = 1.8	12 × 8.8	12 × 6.5	16 × 6.8
Narrow angle of vision.....Q = 3.0	16 × 11.6	16 × 8.6	20.5 × 8.7

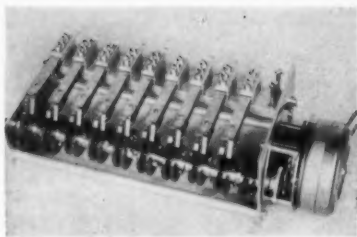


Fig. 63. Spring switches operating as pulse generator of Euromat control unit (Siemens & Halske).

Particular attention should be drawn to the uniform illumination of the screen. Whereas for carbon-arc projection a side-to-center ratio of 75% and for xenon projection an even lower ratio is considered permissible, the side-to-center ratio with SPP projection for both left- and right-hand edge is at least 95%. The special qualities of the SPP lamp greatly facilitate the work of the projectionist. Its operation is confined to switching on and off insofar as this is not automatically effected by the projector. When used, it does not produce any dust or noxious fumes and hence requires no ventilation device. It can readily be operated by any automatic device. It is so small that it can be mounted together with a spare lamp and automatic change-over device in the projector.

An automatic projection system, called "Euromat," was announced during the year by Siemens & Halske.¹⁹⁷ Based on the use of a xenon-light source in the projectors, the system employs a set of spring switches operating as pulse generator and an optical cue scanning system attached to the projector. Sound, including disk reproducer, curtain operation, slide projection and film projection involving, if necessary, films of different widths, can all be automatically preset (Figs. 62-64).

The Bauer U 2 Projector: A few years ago Kinobauer had developed a new projector for showing films both 55mm and 35mm in width. An appropriate type of magnetic-sound head was designed by Siemens-Klangfilm, while the ISCO optical firm in Göttingen had also produced a projection lens suitable for this new machine.

The new Bauer U 2 universal projector is designed for the new cinemas which, deviating from 35mm standard film, wish to include other widths of film in their everyday program. Even though this new projector model does include many of the moving parts of the B 14 projector series, the very fact that a universal machine must be equipped to take various film widths has necessitated new and different methods of construction.

The most striking characteristic of the new Bauer universal projector is the

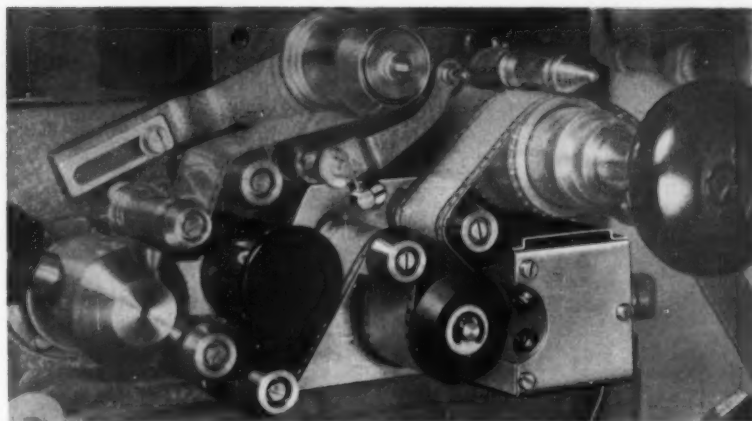


Fig. 64. Optical cue scanner of Euromat control unit (Siemens & Halske).

extraordinary rapidity with which all the relevant parts can be changed when going over from one width of the film to another. Thus the main-drive motor, as a synchronous motor providing the projector head with a uniform frame-speed of 24 frames/sec (for 35mm and 55mm films), can be changed round in one movement so that the head runs at the speed of 30 frames/sec prescribed for the projection of 70mm films. In a like manner both the loop formers, complete with feed and take-up sprockets, can be exchanged in one movement.

In order to prevent any film-buckle under the exceptionally high load-current conditions to be expected with extreme width projection, the equally easy-to-exchange film channel is curved for all frame sizes (Fig. 65). Hence the film describes a shallow lengthwise curve during its passage through the film channel, effectively hindering any chance of film-buckle occurring in a transverse direction. The place of gate-runners is taken by special plastic bands which prevent film emulsion deposit with green prints and also render the gumming of gate velvet on the pressure parts unnecessary.

For changing over the various objective lenses necessary when going from one film-width to another, the Bauer U 2 projector possesses a new-type quick-change lens mount whose construction makes special allowance for the weightiness of the lenses and attachments employed for the wide films. These quick-change lens mounts can take lenses up to 160mm, and in such a way that subsequent focusing with arc-light is rendered superfluous. Thus the projection lens as well can be switched over in the shortest possible time and is in immediate readiness for beginning projection.

The well-known high efficiency cone shutter, especially efficient with the wider picture-forms, gives unusually high light output. When used in con-

junction with the new high-load HI 170 lamp these two can, without difficulty, adequately illuminate the very largest screen widths likely to be encountered.

Cinetarium: Cinetarium is a new way of presenting a seamless all-around projection and producing an all-around film, invented by Adalbert Baltes in Hamburg.

In front of an ordinary camera, operating in vertical direction, a reflecting sphere or hemisphere is mounted (Fig. 66). The image on the hemispherical mirror is photographed and produces a



Fig. 65. Curved film gate in the U 2 projector (Bauer).



Fig. 66. Camera in position for a Cinetarium shot. The hemispherical mirror is seen above the camera lens.

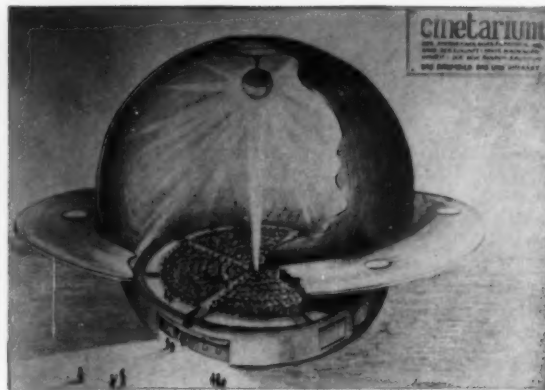


Fig. 67. Proposal for Cinetarium theater.

circular picture on the film. For projection a conventional projector is used, the light beam being vertically directed onto a hemisphere, for instance by means of a mirror.

From this the picture is reflected onto a hemispherical all-around screen or on an all-around screen of a certain width, comparable for instance with a Circarama screen as used by Walt Disney. The great difference between these two systems lies in the fact that the Circarama picture consists of several parts due to the necessity of using several cameras and several films with more or less visible seams; whereas the Cinetarium picture is produced with one camera on one film and projected the same way and therefore has no seams at all and can obtain a picture on a fully hemispherical screen-surface. This system was demonstrated at the Photokina 1958 Exhibition in Cologne in a viewing room with a diameter of approximately 12 m.

The inventor's plans for the near future are shown in Fig. 67.

Great Britain

Xenon Lamps for Projection: The BTH Company, Rugby, have developed a higher pressure version of their 2-kw compact source lamp for use in cinema projection at currents of 60 to 80 amp, and the lamps are now manufactured by the associated lamp company, A.E.I. Lamp & Lighting Co., Ltd., Leicester.¹⁸⁸

The lamp is a three-electrode type, with a probe or starting electrode, which gives the very great advantage over the two-electrode type of being able to start and run in any position, instead of vertically only. This design enables a low pulse striking voltage of about 5-kv to be used for starting, and also enables a single deep mirror surface, with the lamp on the horizontal axis, to be used to give good screen distribution without additional correction lenses. For use with the BTH 16mm equipment a smaller mirror of lower magnification is

used. With standard 4/3 aperture plates and $f/1.9$ projection lenses of $4\frac{1}{2}$ -in. focus, the 35mm xenon lantern gives 4500 lm with shutter running at about 70 amp, and the 16mm 1500 lm at the same current.

A special rectifier for operating this xenon lamp from single-phase supply with suitable interlocks and with less

than 5% current ripple has been developed by Westinghouse in conjunction with BTH Sound Equipment Ltd. During 1958 there were 25 cinema installations and an additional 100 or more will be installed during 1959.

New Carbon for 16mm Projection: The Ship Carbon Company has produced a

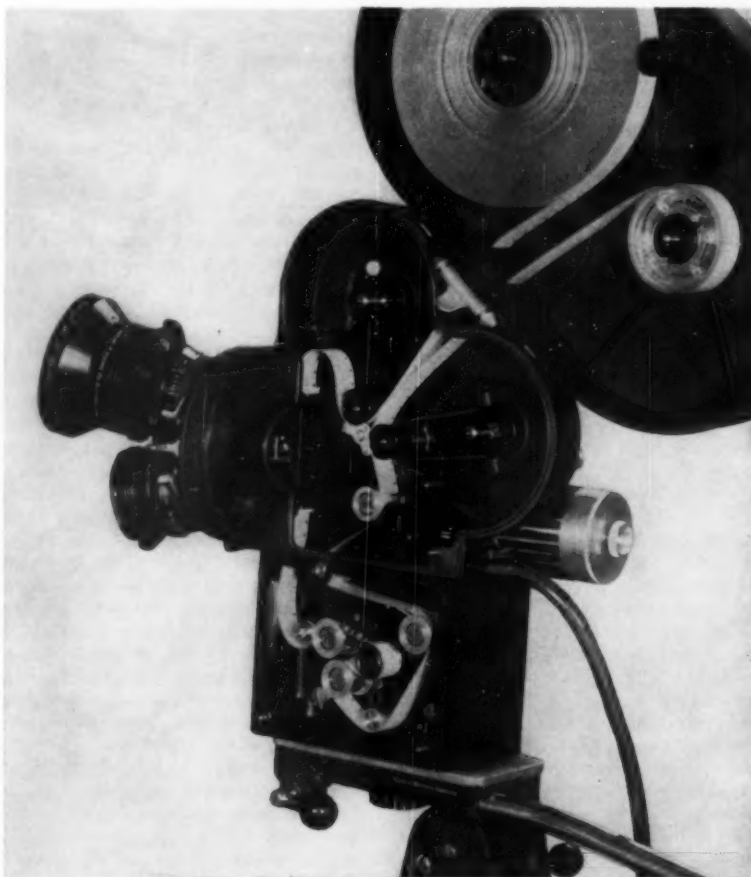


Fig. 68. G. B-Kalee magnetic sound conversion of the Arriflex 16mm camera with 1000-ft magazine.

new 6mm carbon for use as the positive electrode for 16mm arc lamps. This new electrode, the Morganite Pailux L.C.T., has a rating of 30-35 amp and a color temperature of 3750 K.

Todd A-O: Fifteen cities now have Todd A-O shows and five more are being installed at this moment. Equipment is the Philips E2/4000 projector with sound equipment by G.B-Kalee, Philips, BTH, Westrex and RCA.

Ektachrome 16mm Commercial Film: Three laboratories, Colour Film Services, Rank and Reeds, have installed new processing equipment for this film.

16mm Single-System Cameras: The use of prestripped 16mm camera films is growing slowly. G.B-Kalee has produced an excellent conversion equipment of the 16mm Arriflex camera using transistorized amplifiers. The quality of sound obtainable is most impressive¹⁸⁹ (Figs. 68 and 69).

Camera Dollies: Several new crab dollies which are trackless have been seen. The Vinten lightweight pedestal and head is symptomatic of the new thinking and is delightful to use. An attempt has been made in the design to give the cameraman a completely weightless camera. All steering and elevating control wheels are eliminated allowing both hands free for the camera.

A special type of coil offsets the weight of the camera. The coils are connected by flexible steel wire to the pedestal and to the base of the square section center column. Final balance is by trimming weights under the camera platform. The castoring wheels are coupled and are always paralleled, eliminating the steering wobble with free castoring.

	Internal Jack Down	Internal Jack Up
Max. height...	34 in.	40 in.
Min. height...	55 in.	61 in.

The associated lightweight pan-and-tilt head has a torsion spring to balance the tilting camera. A special torsion spring should of course be operated in the "winding up" direction and a change-over mechanism in the head ensures this action whether the tilt is up or down. Cameras up to 100 lb can be used. Despite the above description it is difficult to convey a sense of the ease with which the camera and pedestal can be moved in any direction by gentle pressure with the fingers (Fig. 70).

Television-Cinematograph Viewing: An increasing number of advertising agencies are using a combination of closed-circuit telecine and normal projection in their preview theaters. This is the result of an



Fig. 69. Transistorized amplifier/mixer for G.B-Kalee conversion equipment of the 16mm Arriflex camera.

arrangement perfected by Marconi Wireless Telegraph Co., Ltd., in which a vidicon camera incorporating automatic sensitivity control is mounted with a field lens on a precision turntable which can be moved through 180° with accurate locating points at 90° intervals. For normal projection the beam passes between the camera and the field lens and for closed-circuit telecine the camera is turned to face the projector which is focused onto the field lens. The two alternative positions of the camera enable it to receive pictures from a slide projector or 16mm film projector (Fig. 71).

Camera Negative: Ilford Ltd. has produced an improved version of the F.P. 3 negative known as Type II which

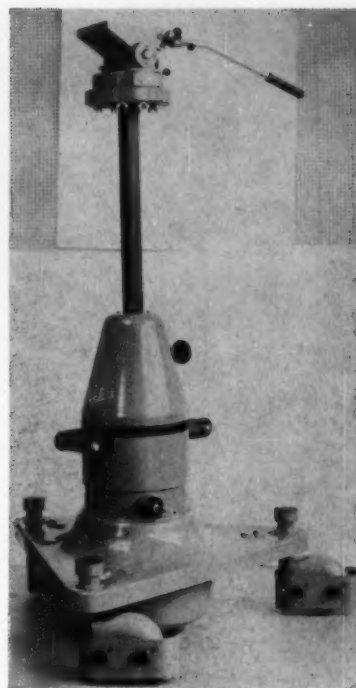


Fig. 70. Vinten lightweight pedestal.

is claimed to show improved sharpness and lower granularity.

X-Ray Camera: Acmade have marketed a new 16mm camera for use with intensified image x-ray apparatus. It is fitted with a multispeed gearbox and a fast pulldown, reducing patient dosage by $\frac{1}{3}$ to $\frac{1}{5}$. An exposure device fitted inside the camera blackens the film outside the exposed frame (Figs. 72 and 73).

A considerable report on the television

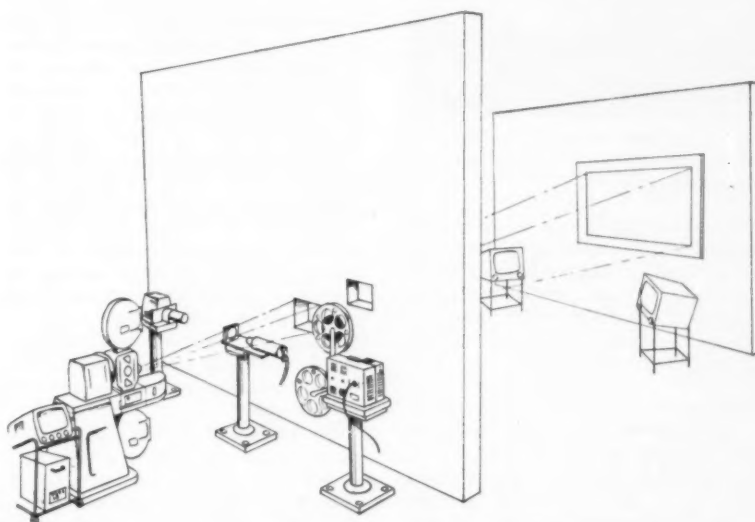


Fig. 71. Vidicon camera and lens mounted on turntable so that it can receive pictures from a slide projector or 16mm film projector.

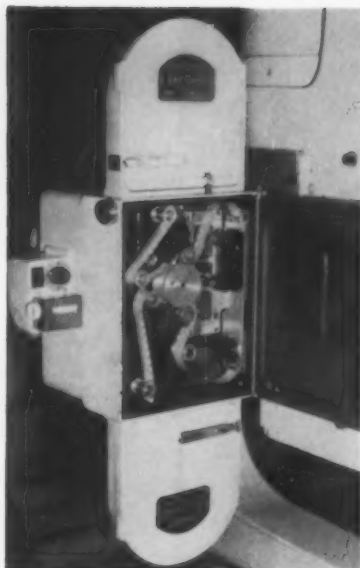


Fig. 72. Acmade 16mm camera for x-ray.

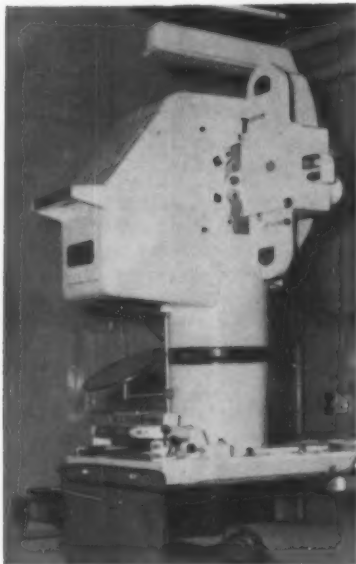


Fig. 73. Acmade 16mm camera mounted on Marconi Intensifier (intensified image) x-ray apparatus.

activities of B.B.C. has been inserted under the major heading of Television, above. Also, a description of the lenses developed by Taylor, Taylor & Hobson has been omitted here, a full description having been included under Optics, earlier in this report.

India

The year 1958 has been one of the worst years in the history of the Indian motion-picture industry. Besieged as it was with a phenomenal rise in "star" prices, sometimes amounting to over 70% of the total cost of production, the last nail to be struck was the removal by

the Government of India of cine raw film from the list of freely importable commodities and making it a licensed import, then following with a reduction of the total value of such imports by 40%. This statement may appear strange as the total number of feature films produced during the year showed no decrease over the previous year's total of 293; however, it must be remembered that a steady rate of production means little, if any, economy in negative film, for the bulk of the economy falls on the number of release prints per picture. This in turn resulted in inadequate exploitation, and consequent loss of revenue.

Strangely enough, all this forced economy in raw stock was restricted to feature films which are produced by private enterprises, while the expenditure by Government itself on its documentaries and newsreels, approximately 25% of the total release footage of the industry, has shown a marked rise. The necessity on the part of the private producer to safeguard his investment has further resulted in a complete abandonment of all "progressive" themes, while more and more reliance has been placed on what has come to be known as tried boxoffice formulas. In spite of this, however, a few outstanding pictures have been produced, particularly in the Bengal sector of film production. In the field of pure entertainment, the unprecedented success of *Mother India* and *Jhanak Jhanak Payel Baje*, both on Eastman color film, has resulted in a scramble for more and more color, and had it not been for the greater dearth of color stock, it would not have been an exaggeration to say that at least 33% of India's output would have been in this medium. When all difficulties have been overcome, the last obstacle to India's expanding film production appears to be the almost bigoted puritanism of the Government Film Censor. There have been instances when complete pictures have been totally banned and the excision of 1000 ft or so from every picture has become a rule rather than an exception. There are no proper appeals.

So far the picture format has remained the old 4:3 aspect ratio, although nearly 80% of the theaters invariably use one or other of the new wider formats, resulting in constant racking up and down of the picture on the part of the projectionist. Attempts are being made, mostly by the Cinematographer's organization, to effect some sort of standardization. Only one picture has been attempted in CinemaScope, and it is yet to be released.

In the field of photography the only progress that appears to have been made is in a rather widespread use of the extremely fast Tri-X film, which has now permitted cameramen to use smaller stops with the same overall lighting values. Import restrictions have also

prevented the entry of new equipment, and the old Mitchells, Newalls, and the few Debries that remain, are fast wearing themselves out. Many of them are running with locally manufactured spares which are being increasingly made with surprising precision, but no attempts have been made either on the part of private enterprise or the Government to set up a factory for the complete manufacture of cameras and accessories. It seems to be certain that if and when such an enterprise is taken in hand emphasis will be laid on American rather than on Continental design.

In the field of sound there has been, during the year, lessening activity by Westrex and RCA. The main reason appears to be a prejudice against the system of "royalty." The last year has witnessed the change to other systems, chiefly the German Bauer, sponsored in this country by a group of three engineers under the name of Kine Engineers. Plans have been drawn up by the group with the Bauer Company for the local manufacture of complete sound systems as well as the Bauer 35mm projectors. Foundations for a well-equipped factory have already been laid.

In the field of processing, the year has witnessed the establishment by Gemni Studios of an extremely modern and up-to-date laboratory for the processing of black-and-white and color film at Madras, the East Coast center of film production. Along with the one already existing in Bombay, the two laboratories should be able to handle India's immediate needs. The entire processing equipment used in both the laboratories is of indigenous manufacture, and has been constructed after independent designs by Processlabs Ltd. Lately, however, the Bombay Laboratory known as Film Center has built a machine exclusively for Eastman Color. The design followed is similar to that of the German Arri.

The color equipment in the new Madras laboratory consists of three daylight machines, each having a capacity of over 2000 ft of film per hour. There are complete facilities for sensitometric and chemical control. The versatility of the laboratory is evidenced by the fact that so far it has handled not only Eastman color, for which it has primarily been constructed, but Geva-colour, Agfacolour and Sovcolor.

Another outstanding event in the industry has been the amalgamation of two major East Coast Studios, Vijaya Production and Revathi Studios, which has resulted in a single unit under the name of Vijaya Productions with fourteen available floors, perhaps the largest of its kind east of Suez. It has in addition a most well-equipped laboratory and several preview theaters. Adjoining the studio is a park known as Vijaya Park extending over several acres which,

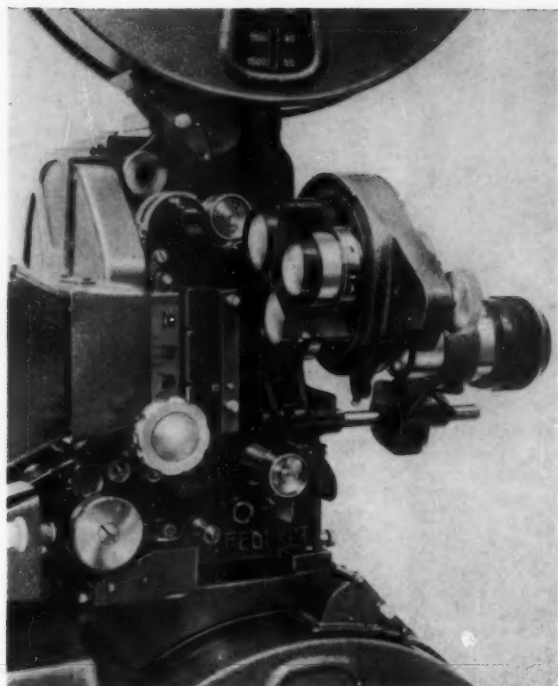


Fig. 74. The Fedi XI TN Projector.

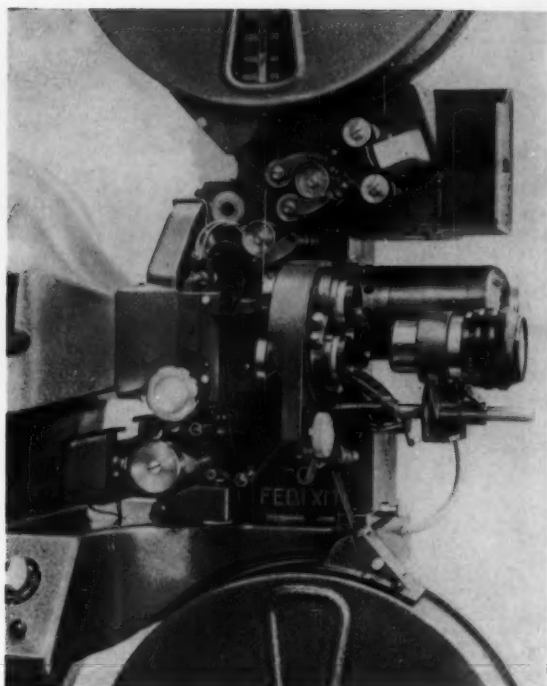


Fig. 75. The Fedi XI TS Projector.

apart from providing relaxation to tired workers, is also occasionally used as an exterior lot.

In the field of television, little or no progress has been made. Apart from a small pilot transmitter which has been installed by AIR (All India Radio) or Akashawani, as it is now known at Delhi, and which has been functioning for the last few months, there is little hope that any more transmitters will be put up in the near future. Radio and television are Government monopolies in this country and, for the present, Government is too tied up with its development programs in other fields to give television a thought.

Trade-union consciousness has also been very much in evidence in all the three centers of film production, especially in the West Coast, where a well-organized network of craft-wise unions integrated together by a powerful federation virtually controls the industry's manpower, including not only all technicians but writers and a large section of the artists calling themselves "character artistes" as distinct from "stars."

The Films Division of the Government of India Films Unit produced 52 1000-ft newsreels and about the same number of documentaries. These are released in 13 different language versions.

There are about 4000 theaters of which about 500 show American and other English-language pictures exclusively. Annual earnings approximate \$30 mil-

lion of which \$10 million goes to the government for entertainment tax.

Taxes and duties imposed by Government include:

1. import duty on raw film — about \$3.00 per 1000 ft;
2. import duty on equipment — 10½%;
3. sales tax on film and equipment — maximum 10%;
4. fees for storage of film;
5. rentals on Government newsreel and documentaries, to be shown compulsorily, amounting to 1 to 2% of the total collections;
6. censorship fees at \$8.00 per reel or about \$100.00 per picture;
7. licensing fees for operation of cinemas;
8. tax on shows at an average rate of 20 cents to 50 cents per show;
9. electricity duty;
10. property tax;
11. municipal dues from 20 cents to \$2.00 per show;
12. Octroi duty on film at about 30 cents ad valorem;
13. tax on posters and publicity;
14. general taxes; and
15. income tax and super tax.

A tabulation of production statistics for features produced in different sectors is:

	Languages				
	Hindi	Tel- ugu	Ben- gali	Others	Total
Bombay (West Coast) . .	106	0	0	19	125
Madras (East Coast) . .	8	62	35	14	119
Bengal . . .	0	0	0	47	2
					293

Italy

No report was received from Italy this year, but a few items of news have come in independently.

In the area of projection equipment the firm of Ing. Angiolo Fedi, Milan, added a new 35mm projector to its line, the Fedi XI T. This comes in two versions: the Fedi XI TN for 35mm standard, wide-screen, VistaVision and CinemaScope prints with optical sound (Fig. 74); and the Fedi XI TS for stereophonic magnetic sound (Fig. 75). The film gate aperture has movable sides for rapid adjustment to different aperture sizes without changing aperture plates. The rotating turret carries three lenses.

Cinemeccanica of Milan began manufacture of a combination 70/35 mm magnetic/optical projector which has been compared with the Philips Todd-AO projector. The Cinemeccanica projector has been announced as an importation by Cinematograph International, Inc., of New York.

A number of 8mm projectors and accessories are made by C.I.R.S.E., Turin. This firm brought out a new 8mm magnetic sound projector, the Cirsosound. Among its extensive range of equipment are the Cirselux, a magnetic 8mm unit with a high-intensity arc lamp; and the Supercomet, an 8mm/9.5mm/16mm silent projector.

Tecnostampa, Rome, announced a new optical printer during the year (Fig. 76), the Tecnoscope Model 110. It was demonstrated at a meeting of nine

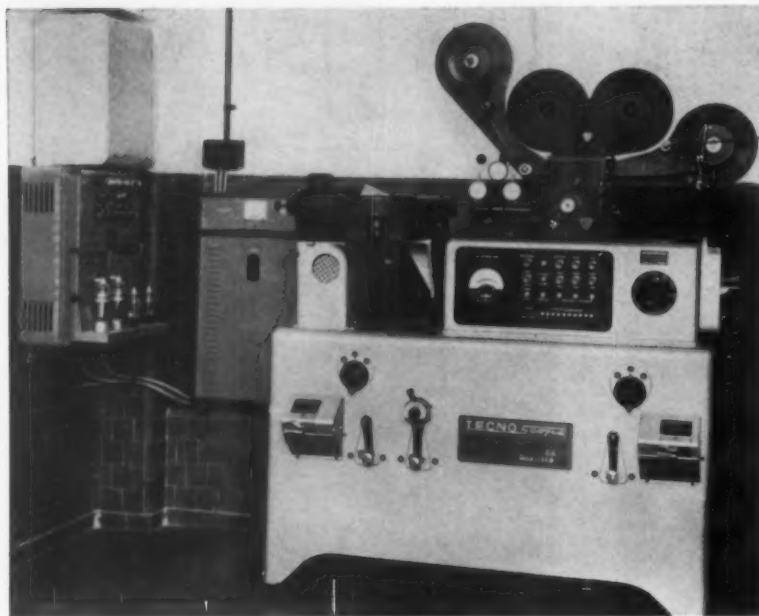


Fig. 76. The Tecnoscope Model 110 Printer.

SMPTE members meeting in Rome in February 1958 at Tecnostampa Labs.

Japan

Approximately 515 feature-length films were produced in Japan in 1958, including 14 feature-length documentaries. About 260 new theaters were constructed, most of them in educational institutions or municipal auditoriums, bringing the total number of theaters, commercial and other types, to 7100.

35mm Equipment

A 35mm projector mechanism, the NA-2 Super Phirex was developed by Osaka's Nippon Onkyo Seiki Co. in collaboration with Kotabuki Industrial Co. Ltd. This projector incorporates some interesting Japanese-adapted features. Included are a dynamically-balanced single-blade conical shutter of shallow depth that revolves smoothly and quietly at 2880 rpm; a curved gate design in conjunction with a film trap force-cooled by a circulating water jacket and a pulsed air jet; 4-in. diameter prime lens barrel mounting; and a permanently mounted 4X screen focusing monocular scope which is unaffected by anamorphic or other supplementary lenses. Internal lubrication is filtered and force-circulated, sealed by a removable rear cover (Fig. 77) which, like the operating side door, also is provided with a large plastic window to facilitate visual inspection during operation. The housing is functionally simple and straightforward and provides for convenient front-located focusing and framing adjustments. These projectors have proven unusually quiet during operation.

The automatic projection system, known as the Auto-Conductor, previously introduced by Nippon Onkyo Seiki was redesigned for flexibility's sake. Its main control assembly (Fig. 78) now includes plug-in mount types for functional control relays and electronic tubes, with both individual relays and the collective assembly housed under transparent plastic dustproof covers. The system provides for automatic selective carbon-arc striking; synchronized changeovers of projected images together with either four-track magnetic or optical sound channels; and automatic cutoff of all out-going machine functions following film tail leader runout. System actuation requires simple advance precuing by application of a single conductive foil tab onto one edge of each film reel, parallel with photographic motor start cue mark locations. Thereafter, during running operation all actions become automatic (barring manual trim adjustments to the prestruck incoming arc-lamp gap); additionally, a built-in safety device constantly monitors normal reel running to institute emergency stop of all operating functions in event of film breaks or other abnormal discontinuities. Earlier models of the latest Auto-Conductor design have been used for more than two years.

A few other 35mm projectors, especially the portable type, were introduced during 1958 but no significant developments otherwise were added. There were no reports of new developments in the 35mm theater sound reproducing equipment field.

A new entry in carbon-arc projection illumination is the Royal angle-trim,

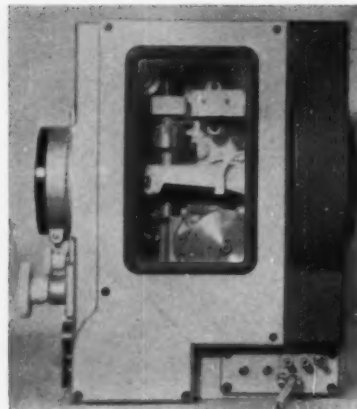


Fig. 77. Gearside view of Super Phirex 35mm projector head.

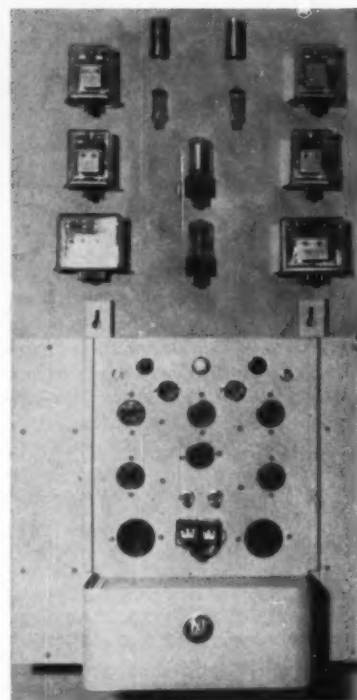


Fig. 78. The Nikkyo Auto-Conductor main control assembly showing miniature timing circuit thyratrons, voltage regulator and rectifier tubes.

rotating, positive high-intensity lamp-house, mounting an 18-in. diameter reflector, a product of Komitz Industrial Co., of Tokyo. It is rated for an operating range of 80 to 120 amp, employing 10mm positive and 9mm negative carbons.

A newer model PB-110-A of Nanao Seiki's Brian Super Power lamphouse called Hipomer also was marketed with maximum operating current rating boosted to 135 amp and fitted with an $f/1.7$ 18-in. reflector. An unusual feature is an automatic arc striker mechanism consisting of a solenoid actuator for

briefly elevating the angle-mounted negative holder assembly to the point of its carbon tip engagement against the positive trim crater. This action is cushioned against shock which might cause carbon fracture, as well as excessive retraction, by a double-acting oil-damped piston. This feature was developed for adaptation to automatic devices, particularly the Auto-Conductor.

An especially important development was that of high-intensity inert gas-discharge sources for 35mm projection illumination. The Nippon Onkyo Seiki firm introduced the Xerex 2-kw xenon-tube projection lamphouse. It was first installed in September in the new Osaka Shokuin Kaikan (Hall for Prefectural Officials). About a dozen installations had been completed by the end of the year. This lamphouse is believed to be the first illumination source of its type introduced on the world market outside of West German Sources. Nippon Onkyo reported this lamp as the first major development from the company's new electronic developmental laboratory and home office which were opened in April in a suburban addition of greater Osaka City, in product collaboration with three other basic component suppliers.

Characteristics of the Type UXL-2000 2-kw xenon-discharge lamp, manufactured by Ushio Denki Kogyo, are said to include working terminal voltage of 27 v at a maximum of 70Z d-c producing luminous flux density claimed as 65,000-candles/sq cm. A vibrator-actuated, resonated starting circuit produces an initial surge voltage peaking upwards to nearly 40 kv with main operating power source then transferred to a special selenium rectifier. Coaxially opposed tungsten electrodes with conically tapered tips are employed within a special crystal envelope filled with xenon gas of approximately 8-atm static pressure which increases threefold at full rating operation. Collection of source light is accomplished by a combination of a metallic reflector, 4 in. in diameter, mounted im-

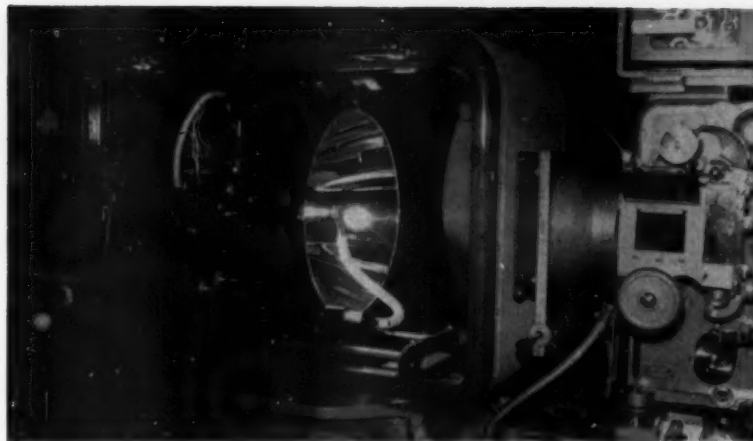


Fig. 79. Dojun Koki Company all-new XK-35 "King Light" projection lamp.

mediately in front of the tube globular center facing rearward toward the main elliptical second-surface glass reflector of 16-in. diameter. Spectral characteristics of the UXL-2000 lamp are said to be closely comparable to noon sunlight while its average life is rated at 800 hr with full power input which may be increased to a useful 1200-hr span at reduced power.

Early in December, a xenon projection lamphouse was introduced by Dojun Koki Co., Ltd., of Tokyo, manufacturers of King brand carbon-arc lamphouses. The new model, XK-35, employs Type XDA-3000 3-kw xenon lamp developed by Asahi Asphalt Co. Laboratory (Fig. 79). This lamphouse incorporates a specially designed aspheric elliptical glass reflector (Fig. 80).

It employs two tungsten electrodes of differing diameters and shapes inserted within a clear quartz envelope filled with xenon gas at over 10 bars static pressure. Maximum input power ratings for this tube are given as 26 v at 120 amp d-c, claimed to yield total luminous flux of 120,000 lm from 2-cm point source at the cathode tip, rated at 6000 K color temperature and peak brightness of 68,000-candles/sq cm. Brightness distribution of this arc source is shown as a horn-shaped radiant pattern extending outward from the cathode tip toward the blunter anode (Fig. 81) in contrast to the more familiar positive crater pattern of the d-c carbon

arc. Within the range of visible radiation emission between approximately 4000 Å to 7500 Å, this lamp exhibits remarkable uniformity in its radiant spectral graph, appreciably free from deviations to account for its intense whiteness of illumination. With the lamp horizontally mounted, examination of the polar distribution graph of its visible radiation reveals that light output ideally can be collected throughout a bisected solid angle of 250° and this has been practically achieved by using the aspheric elliptical reflector made for this particular XK-35 lamphouse exclusively. It further is claimed that enclosed xenon-arc operation is extremely stable and free from observable luminous fluctuations caused by input voltage or current transient shifts and that it also performs very well at power input values reduced up to 60% below maximum rating. Average life for the XDA-3000 tube is claimed to be 450 hr at full input rating with important extensions possible under reduced power operation.

A comparison of the XK-35 operated at power input of only 2.3 kw with the King K-17 simplified high-intensity carbon-arc lamphouse fitted with 17-in. diameter reflectors and supplied with d-c input of 4-kw (40 v, 100 amp) revealed readily appreciable light gain and noticeable advantage of the xenon source in both whiteness and "snappiness" of its

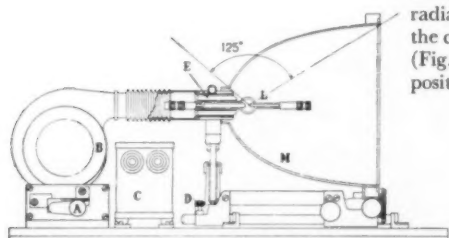


Fig. 80. Sectional drawing of XK-35 xenon projection lamphouse key components including: (A) vibrator impulse starter; (B) sirocco cooling blower; (C) high-voltage starter transformer; (D) lamp mount focusing adjustment; (E) finned heat radiator jacket for anode sleeve; (L) XDA-3000 xenon lamp; and (M) aspheric elliptical glass reflector.

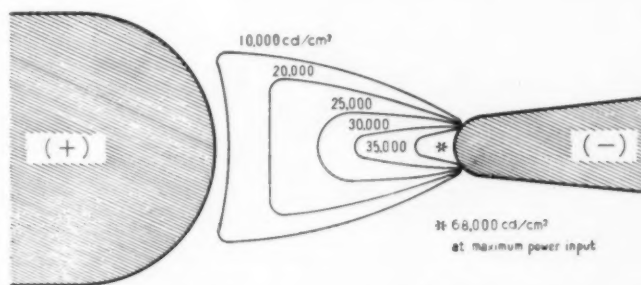


Fig. 81. XDA-3000 high-intensity xenon arc brightness distribution.

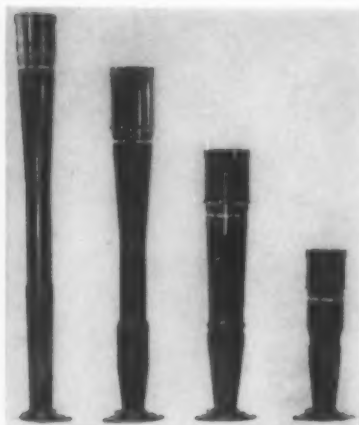


Fig. 82. Four of the new series of five television telephoto lenses for 35mm television cameras by Canon Camera Company of Tokyo. Focal lengths shown range from 400mm to 1000mm.

projected images; but most remarkable was the exceptional uniformity of screen brightness distribution carried out to every corner, with total absence of any observable center "hot spot" from the XK-35 despite its operation at 44% lower power input than the carbon arc. Demonstration film subjects included dual prints of subjects both in black-and-white and domestic color process, climaxed by Eastman color CinemaScope, the latter projected to 2.35 aspect ratio with width slightly greater than 35 ft.

Announcements have been made of continuing developments and improve-

ments. At least one other respected Japanese lamphouse manufacturer has entered this field.

The success of the xenon lamp is dependent upon its power supply; and in this field, Sansha Electric Manufacturing Co., Ltd. of Osaka made major contributions during 1958. Research conducted by Sansha into xenon gas-discharge characteristic behavior established that starting reliability, stabilized operation and the attainment of acceptable xenon-tube life are directly dependent upon correct superposition of the temporary starting high-voltage a-c waveform on top of the d-c input which during operation must exhibit minimized a-c ripple content and constant current characteristics exhibiting firm stability of output under conditions of a-c line source voltage shifts or phase imbalance. A subsequent design tailored toward economy both of the exhibitor's investment and projection equipment floor space requirements incorporates twin rectifier units to serve two xenon lamphouses contained in a single housing.

One major forward stride for the domestic industry was the production and use of Fuji 35mm color negative which freed Japanese producers from dependence upon imported camera raw stock for color productions. This negative, which both chemically and physically resembles a continental product (Agfacolor) rather than American color stock, was used for four feature productions and one feature-length documentary filming. With availability of this domestic color negative stock, Japanese



Fig. 83. The four 35mm "Cine-Prominar" precision camera objective lenses offered by Kowa Koki of Nagoya.

feature production is considered certain to show further gain in percentage of color utilization.

Demands of the mushrooming TV industry lent great impetus to camera-lens and production-equipment manufacturers marketing new products for domestic and export applications. Canon Camera Co. of Tokyo offered a new matched series of five TV camera telephoto lenses in graduated focal lengths ranging from 300mm (f/4) to a super-reaching 1000mm lens of f/11 (Fig. 82). Canon likewise offered two new TV zoom lenses, one of 19-element construction having a focal range from 60mm to 400mm with average speed of f/4; and a 135mm to 900mm giant zoom lens of 17-element construction rated at f/9 which weighs 66 lb and requires a support bracket comparable to a small projector pedestal. Resolution standards for these zoom lenses are stated to be 200 lines/in. at center and 50 lines/in. at the perimeter. Kowa Koki of Nagoya introduced a four-lens series called Cine-Prominar

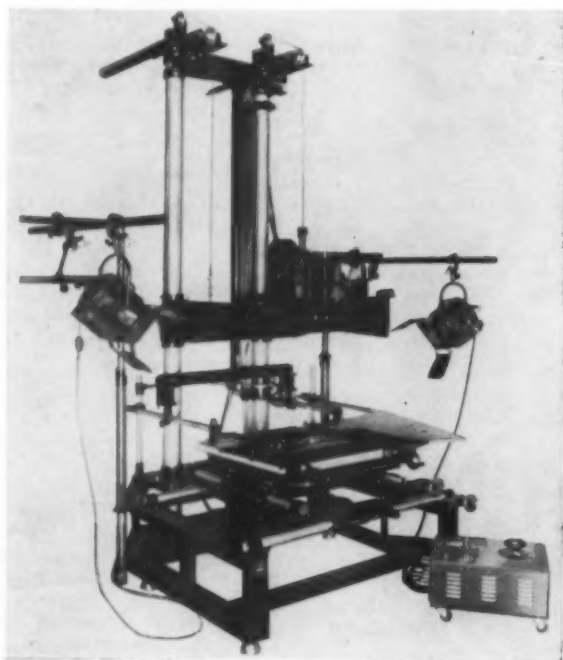


Fig. 84. Model SA-III Animation Stand by Seiki Seisakusho K.K. of Tokyo.



Fig. 85. Model OP-C 35mm optical printer by Daiichi Seiki Co.

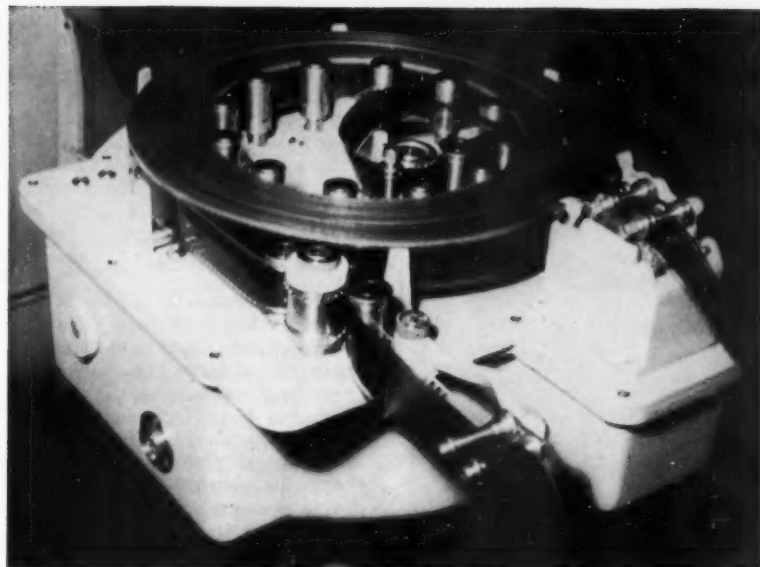


Fig. 86. 35mm continuous loop accessory machine for dubbing applications as developed by Mohara Kenkyujo Co.

which includes 40mm, 50mm and 75mm focal lengths all rated at $f/2$ (T 2.3), and a 100mm $f/2.3$ (T 2.6) (Fig. 83).

Daiichi Seiki Co. produced a new gyro-type 35mm production and TV camera tripod with tilt range of 130° , and 360° revolution, in two stand sizes including a "high-hat" version of 80-cm height, and a full-length stand extending 147 cm. For mobile camera work, Nikki Kogyo Co. developed an automatic camera crane car whose working platform of $1\frac{1}{2}$ sq m may be hydraulically raised and lowered while remaining level in all positions between 5 m maximum and $2\frac{1}{2}$ m minimum height. The platform also can revolve and lock at any place throughout a full circle. Mounting is on a conventional domestic light truck chassis and the assembly gross weight is given as 6270 lb.

Inauguration by one major Japanese producer (Toei) of an active new division for exclusive production of animated cartoon subjects was the springboard for Seiki Seisakusho to develop and produce two 35mm animation stand models, one of 14 ft overall height which mounts a layout table of 30-in. by 42-in. dimensions provided with both motor and manual drive means capable of a full circle of revolution, while another model 13 ft high has a table manually adjustable in four planes (Fig. 84).

Daiichi Seiki Co. introduced the Type OP-3 35mm optical printer whose specifications include a printing speed range from 4 frames down to $\frac{1}{2}$ frame/sec. It is equipped with a variable shutter adjustable from 0 to 170° opening and a variable focusing finder by which the normal 35mm aperture image may be reduced to one-fourth the original size or enlarged

four times. Incandescent lamps ranging from 500 to 1500 w may be employed, and the printer is said to be extremely flexible in performance (Fig. 85).

Nippon Onkyo Seiki Co. announced that 35mm telecine projection equipment is being developed for the Super Phirex projector, cited above, together with Nippon Victor optical soundhead and compact xenon-light source. The mechanism will use a modified 2-3 intermittent pulldown movement coordinated with a special shutter for TV compatibility, and while the illumination source will probably be of continuous-discharge type, there is a possibility that a pulsed type may be used.

An interesting new 35mm specialty item made available for dubbing purposes is a continuous-loop machine accessory developed by Mohara Kenkyujo Co. (Fig. 86).

The first diffraction-type "cold light" dichroic filters made in Japan were produced by Tokyo Kogaku Co. and initially applied in filming a sequence of a fire scene at close range in Shochiku's *The Eternal Rainbow* in Fujicolor.

During the Photokina at Cologne, Germany, Hokushin Co. of Tokyo was recipient of an Honorable Mention Award for the design of their latest model SC-7 2-case 16mm sound projector which employs printed circuits and all miniature electronic tube types in its compact amplifier and provides for optional reproduction of both optical and magnetic tracking recording (Fig. 87). The 3-claw pulldown movement was designed to attain an average life of 1000 hr for his delicate device. Hokushin also announced the third production design over as many years in their Model TC-38

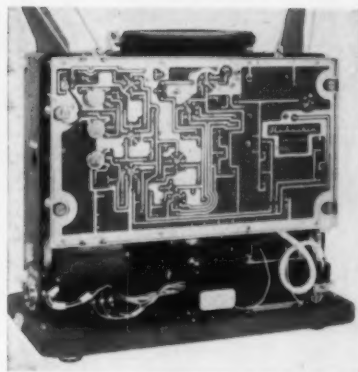


Fig. 87. Amplifier printed circuitry in the Model SC-7 16mm sound projector by Hokushin Company of Tokyo.

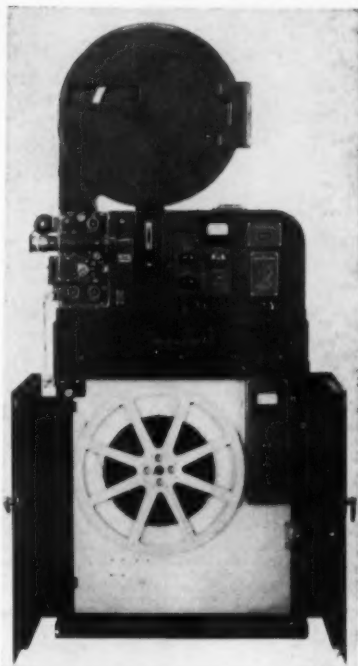


Fig. 88. Latest Model TC-38 16mm Telecine Projector by Hokushin Kogyo of Tokyo.

telecine 16mm projector (Fig. 88). A 2-3 disk shutter with 120° opening is employed and the incandescent light source may range from 300 to 1kw. Transistors have been employed for the first time in this class of equipment in the low-level sound circuits adaptable to both optical and magnetic-track recording, and the equipment is intended for coordination with vidicon-type TV cameras.

A 16mm vertical-type high-speed processing machine was announced by Otomo Manufacturing Co. (Fig. 89). Normal developing speed by jet-spray process is rated at 2800 ft/hr, but this may be either increased or retarded to adjust to faster or slower fine-grain emulsions. Overall dimensions for the Otomo

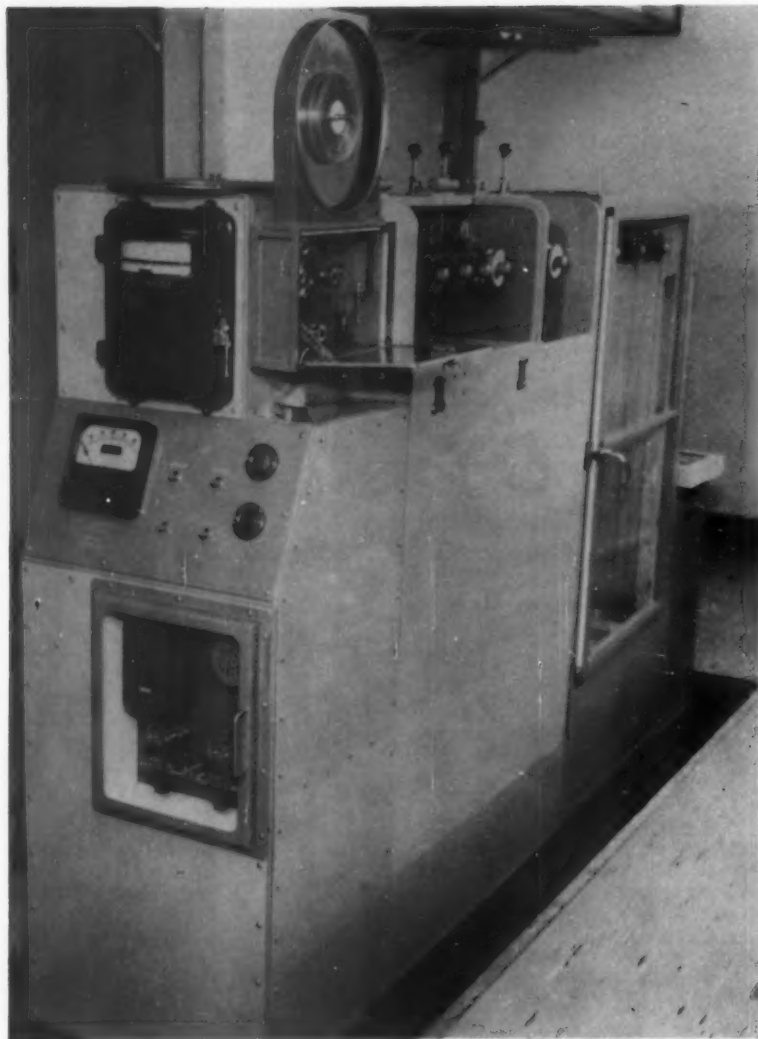


Fig. 89. New high-speed automatic 16mm film developing machine of space-saving vertical type developed by Otomo Manufacturing Company.



Fig. 90. The 50mm f/1.4 Kinotar 16mm camera lens developed by Ichizuka Optical Company.

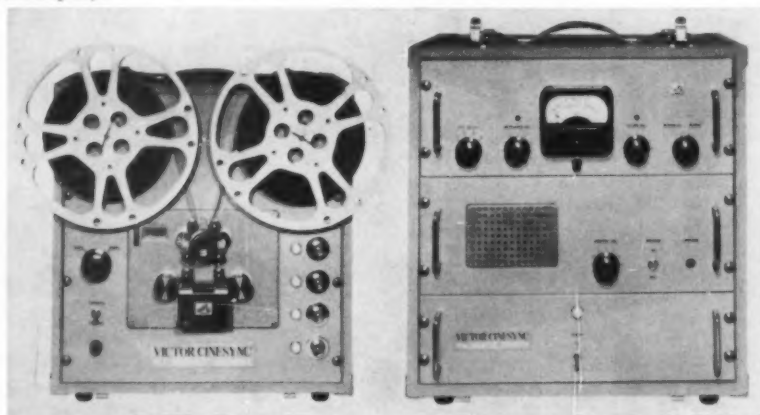


Fig. 91. The Victor Company of Japan, Ltd., Model CS-160A Cinesync 16mm magnetic film recording equipment.

machine are given as 225 cm high, 50 cm wide and 140 cm long. It is installed in Tokyo's JOKR-TV (KRT).

Ichizuka Kogaku Co. developed a new series of three Kinotar 16mm camera lenses employing "C" mounts, for color photography applications. These include a 25mm f/1.4 lens of 6 elements mounted in 4 groups permitting focusing from 60 cm to infinity; a 50mm f/1.4 also of 6 elements and a less expensive 50mm rated at f/1.9 with 4 elements in 3 groups (Fig. 90).

To meet demands for improved standards of TV film presentation, both Seiki Seisakusho and Daiichi Seiki Companies developed automatic film-cleaning machines for interchangeable use with both 35mm and 16mm film gages. The two models appear closely comparable in performance with cleaning-speed capabilities ranging between 2000 and 2600 ft/hr; and although employment of the active cleaning agent might be frowned upon elsewhere, carbon tetrachloride is recommended for both locally produced machines.

In contrast to the year's dormant status in 35mm sound recording and reproducing equipment progress, the 16mm field was expanded by introduction of one fixed-cabinet studio type, and two portable designs of magnetic-tape recorders. Kondo Seisakusho produced a professional studio recorder called the Magnaphone primarily for use with 16mm oxide-coated films, but also including facilities for recording and playback of optical tracks. Independent amplifier channels are provided for recording and playback and the unit is self-contained in the floor-mounted cabinet but includes provisions for remote control of principal functions.

Victor Company of Japan, Ltd., marketed their new Cinesync 16mm recorder as a two-case portable model, available either in single-channel or two-

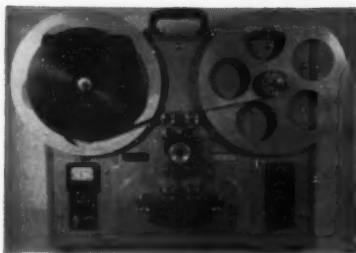


Fig. 92. The Model DM-16A Synchro-corder 16mm magnetic recorder by Doi Company.

track versions (Fig. 91). This equipment mounts reels containing up to 1200 ft maximum of striped film and operates at standard 16mm sound speed of 7.2 in./sec, permitting up to 33 min of continuous recording. Input impedance is 600 ohms, and frequency response is specified as within ± 1 db from 100 c to 5000 c, and within ± 4 db in extended ranges from both 50 c to 100 c, and 5000 c to 10,000 c with flutter content less than 0.3%. Specifications for magnetic-track placement on 16mm film appear to be Victor's own arbitrary selection, not particularly compatible with others. For single-track recording on 16mm film base sprocket-hole perforated on one side, a center striping of 5-mm width disposed around the film centerline is employed, while for two-track recording, the added track is of 2.5-mm width measured inward from the film edge opposite the sprocket perforations. No balancing thickness striping is specified on the film edge outside the sprocket holes. A second recording unit designated as the DM-16A Synchrocorder was placed on the market by the Doi Company, but while believed similar in application and general performance to Victor's Cinesync no specifications were made available for inclusion in this report (Fig. 92).

In anticipation of a growing number of educational TV stations in Japan, the Elmo Co. of Nagoya has produced an 8mm telecine projector (Fig. 93). Although Elmo pioneered in the field of edge-coated magnetic-track recording on 8mm, no sound-reproducing means are provided in this projector, probably because nonsynchronized background music and photographic titling would be more economical. Hokushin Co. also produced an 8mm telecine projector but with provision for magnetic-stripe synchronized sound reproduction.

A number of new 8mm camera models were introduced during 1957, so it was expected that new designs would decline in 1958. While this was indeed so, nevertheless a few significant developments did reach the consumer production stage. Kowa Koki marketed the first magazine-loading type (Figure 94) in two versions of the same basic model. One is a single-turret type made available with a combination anamorphic-

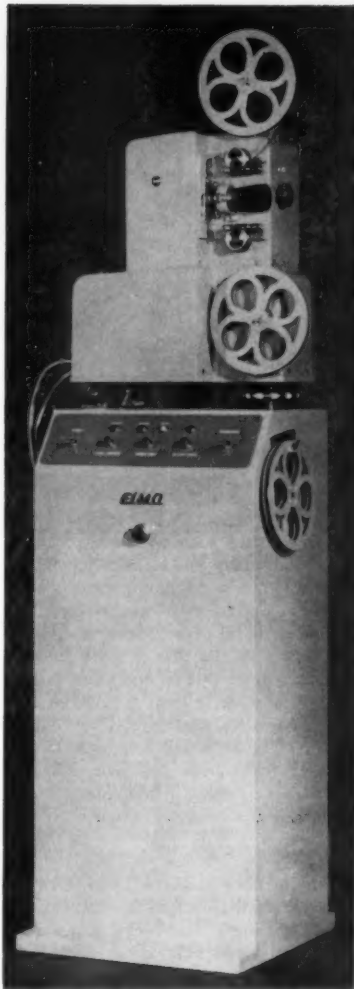


Fig. 93. The Elmo 8mm silent telecine projector.

prime lens called their Gold model (Fig. 95) and a two-turret camera, otherwise identical, called the Silver model which mounts a general-purpose lens plus choice of wide-angle or telephoto second lens (but not having spacing clearance to accommodate an anamorphic combination with a second objective lens simultaneously mounted). The Sekonic Co., heretofore makers exclusively of illumination metering equipment, entered the camera field with the Elmatic 8, a three-turret spring-wound motor type fitted with a built-in light meter.

Arco produced the triple-turret Arco-8 Technica incorporating their exclusive variable-shutter design together with variable-drive speed selection including reverse, to permit lap dissolves, and fitted with a wide latitude light meter (Fig. 96). A Clastone electric motor-driven 8mm camera was introduced. Another newcomer is the Rexer-8. This also is a triple-turret model with electric motor drive, which features an accessory wireless con-



Fig. 94. 8mm film magazine-loading cartridge designed and produced by Kowa Optical Company for use in their Kallo Gold and Silver model cameras.



Fig. 95. The Kallo Gold 8mm camera offers an $f/1.9$ combination anamorphic/objective lens in the first magazine-load type produced in Japan.

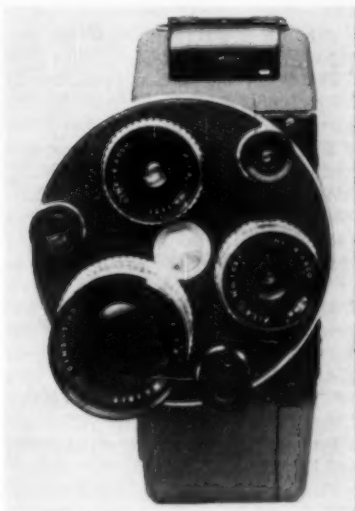


Fig. 96. Head-on view of the Arco-8 Technica camera showing included standard equipment precision lenses of $f/1.4$ rating, and built-in light meter with protective multiplier-shield.

trol for remote start and stop of camera drive, assuming preset field focusing and iris stop adjustments necessarily made to the tripod-mounted or otherwise rigidly supported camera.

From a merchandising standpoint, however, the sensation of the year was the new Mamiya 8JE camera, a single-speed electric-drive (by two Penlite-size



Fig. 97. The new precision Mamiya 8JE camera with 13 mm f/1.9 lens.

batteries) fitted with a single 13mm f/1.9 lens. In no sense a toy, this newest product from a very respected maker of miniature still cameras (Mamiyaflex, Mamiya-16) startled the domestic market with a retail price under \$16 equivalent and is anticipated to have tremendous influence in expanding the scope of 8mm camera ownership (Fig. 97). The foregoing cameras dominated 8mm-field developments during 1958 and nothing new of significance was produced in the corresponding projector field.

The television equipment industry by the end of 1958 had become Japan's fourth largest (business running at a rate of \$555 million per year). TV receiver production is now running at a monthly rate of 400,000 sets, four times that of one year ago. At the close of 1958 there were a total of 45 TV transmitters in regular operation, 26 for the Government-sponsored Nihon Hoso Kyokai (NHK: Japan Broadcasting Corporation), and 20 commercial stations. In December, 1958, the official number of TV receivers in the hands of consumers and registered with the Government as required for reception license from NHK was 1,516,762, but it is believed that the actual number was well in excess of 2,000,000.

The microwave network now in daily service extends nearly the full length of Japan from Kagoshima City near the southern tip of Kyushu Island to Asahikawa in the north-central part of Hokkaido. Several major trunk-line extensions from Tokyo and Osaka to the West Coast of Honshu also have been completed, and it is estimated that potential coverage of the present network and stations in operation is at least 60% of Japan's population, presently estimated at 91,000,000.

Color television is regularly operated on an experimental basis both by NHK and the commercial JOAX-TV (NTV network) of Tokyo. During a recent in-

terview, Mr. Shimizu, President of NTV, stated that they were following a policy of continuing color television on an experimental basis and were importing a second RCA color TV camera. Mr. Shimizu feels that his organization is technically able to start regular color broadcasts at any time the Japanese economy permits; however, he views this as still being two or more years away because of receiver manufacturing cost factors and associated problems.

Subscription television was begun in Hong Kong but currently the system has 400 fewer subscribers than when it was launched.¹⁹⁰

Japan has been reported to be working on a video-tape recorder.¹⁹¹

In the past year there were no significant Japanese developments in black-and-white TV equipment. As was suggested in the Progress Report for 1957, the industry expansion has been at such a rate that items such as camera chains, studio equipment and transmitters which are locally produced, have generally been frozen in design in efforts to meet the volume demand of broadcasters.

It is anticipated that at least 38 more stations will be put in operation during 1959, 12 of these belonging to NHK and the remainder, commercial or educational. The objective is a total of 108 stations, calculated to give complete coverage of the entire Japanese nation on its four main home islands.

Mexico

Our member in Mexico reported that there were few technical developments in Mexico during 1958. Several new laboratories and some new television stations were in the building stage.

Mexican producers were planning to make five films a month.¹⁹² Hollywood filmed several pictures in Mexico.¹⁹³ Venezuela was said to be the best Mexican film market.¹⁹⁴ Mexican film producers saw a record income for 1958.¹⁹⁵

Television began making inroads in Mexico and the film industry was making plans to fight back.¹⁹⁶

Poland

Polish film production is concentrated in three centers: Warsaw, Lodz and Breslau (Wroclaw) with feature-film studios in the two latter cities only. In the near future two new stages will be added to the documentary-film studio in Warsaw, making it possible to produce feature films in that city also.

Annual production of films is as follows: feature, 19; documentary, 180; educational, 90; cartoons and puppet films, 8; and dubbed, 40.

The Film Studio in Lodz: This studio has three stages, about 800 sq m, 770 sq m and 270 sq m in size. A fourth stage, 900 sq m in size, is presently under construction. The power station can supply 8000

amp d-c and 1,500,000 w a-c. There are also many mobile d-c and a-c power units. The arc lamps — Mole-Richardson K.P.D., Strasser-Deltschaft — 125 in all, consume 15,000 amp; 450 incandescent lamps consume 1500 kw. The cameras are of different types: Super Parvo, Parvo L, Newall, Moskwa and Cinephon. The studio has its own laboratory with French developing machines, Debie Type A and the new Debie DUC 40. Matipocolor and TU printers from Debie, Bell & Howell, and Tumpach are used. Sound recording, cutting and re-recording are done solely on magnetic film, 35mm or 17.5mm, using new magnetic sound equipment from G.B-Kalee, Klangfilm-Siemens and FBT, the Polish make. The studio is equipped with various anamorphic lenses and attachments — Dyaliscope, Totalvision — and with complete stereophonic sound channels for the production of wide-screen films with 4-track magnetic sound.

Breslau Film Studio: The film studio in Breslau (Wroclaw), WFF2, has three stages, 1300 sq m, 900 sq m and 270 sq m in size. The power station can supply 3000 amp d-c, and 1,500,000 w a-c. The studio possesses both d-c and a-c power units. The 70 arc lamps consume about 8000 amp; and 300 incandescent lamps have a total power of about 1000 kw. The cameras are of the same types as in the Lodz studio.

The sound-recording system is fully magnetic; all sound takes are made on 35-mm or 17.5mm magnetic film. The magnetic recorders are Swedish (AGA) and Polish (FBT).

Warsaw Documentary Film Studio (Wed): For newsreel work, Arriflex, Debie, Cinephone and Newall cameras are used. The studio has its own laboratory with four developing machines — Houston, Ponorka, Debie D-20-N, Awtovello — and many printers — Bell & Howell, Debie, Tumpach.

The sound-recording system is wholly magnetic. G.B-Kalee equipment is used for recording and re-recording. In special cases $\frac{1}{4}$ -in. tape is used for sound editing.

Lodz Educational and Scientific Film Studio (WFO): The studio has its own lighting equipment and cameras, developing laboratory with Debie DUC machines and Debie and Tumpach printers. Sound recording is done on 35mm magnetic film, or $\frac{1}{4}$ -in. tape.

Warsaw Dubbing Studio (SOF): This studio, with a section in Lodz, is well equipped with FBT (Polish) magnetic sound recorders. There are three acoustically adapted recording rooms with projection facilities.

Cartoon and Puppet Film Studios: The Cartoon and Puppet Film Studio, SMF,

in Warsaw, the Cartoon Film Studio, SFR, in Bielsko-Biala, and Puppet Film Studio, SFL, in Tuszyn, possess necessary basic equipment — cameras, lamps, and auxiliary equipment.

Laboratory Processing: Prints are made by a central laboratory in Lodz. This laboratory is equipped with rapid developing machines (Multiplex), and printers (Matipo TV, Matipocolor, Bell & Howell, UK, Tumpach) and reduction printing machines (Tipro 35-16mm).

Annual print production is: 11 million black-and-white 35mm prints, 3 million 35mm color prints, 9.5 million black-and-white 16mm, and 0.6 million 16mm color prints.

Theaters: Poland has 1,495 cinemas with 35mm projectors. Of that number 998 are State theaters and 497 belong to the trade unions. There are at the moment 50 cinemas adapted for wide-screen films in the ratios of 2.55:1, 2.35:1, and 1.85:1.

A few are equipped with stereophonic sound. The largest wide-screen cinema in Poland, called "Gigant," was opened recently in Breslau. Its screen has a width of 25 m and a projection distance of 70 m. This cinema contains 6000 seats.

All town cinemas use arc-lamp projectors (35mm) and 50% of these projectors are Polish made (Types AP-1, AP-3, AP-4 and AP-5); 30% of the cinemas are equipped with Ernemann VII B machines; and the remainder use other machines, chiefly of earlier German manufacture — Ernemann IV, AEG, Bauer, etc.

Service in the country is maintained by 300 mobile cinemas mounted in special trucks and consisting of a portable sound projector (35mm), chiefly TK 35 Zeiss Jena, folding screens, and combustion-engine generators. Every week the mobile cinemas give performances in over 1800 villages. In addition, there are 1370 local cinemas with 16mm sound projectors, mainly Polish made — AP 11, AP 11 U, AP 12, and from the U.S.S.R., 16ZP Ukraina and Hungarian, Terta. Rural cinemas are generally small, up to 250 seats, and are open three days a week.

Over 3000 16mm projectors are installed in schools, factories, cooperatives and other organizations. They are used mainly for audio-visual education purposes.

The above figures clearly demonstrate that this branch needs a further intensive development. In fact, the index of cinema seats per 1000 inhabitants is now 27.8 in the towns and 11.2 in the rural areas. Under the "7-years plan" 250 large cinemas are to be built in towns and 530 in the country. The number of trade-union theaters is to be increased to about 530.



Fig. 98. Magnetic recorder 35mm.

Distribution: Distribution of films in Poland is managed by two State agencies, one, CWF, being concerned with feature films, and the other, CRFO, with educational and scientific films. These agencies also maintain technical service. In Warsaw and the 17 larger towns they have their own branches or agents responsible for conservation of the prints. Gradually, the basic protective methods are being introduced: coating, cleaning, surface regeneration and repairing of the damaged prints.

These precautions are taken in order to improve the quality of performance during the life of the print.

Production of Raw Film and Magnetic Film: The Polish photochemical industry produces the basic types of motion-picture film, namely positive raw stock under the trade name "Foton" in 35mm and 16mm width. In the last year, production of multilayer color positive film was started. The practical results achieved with this new stock are encouraging.

The production of magnetic film and tapes is now in the experimental stage. The suitable iron pigments with medium coercivity and great sensitivity were chosen. The surface of the film is polished by a special process, improving the response and greatly diminishing the wear of magnetic heads.

Motion-Picture Equipment Production: The LZK factory in Lodz is noted for its range of 35mm and 16mm projectors. The Warsaw Film Equipment Factory, WZWSF, has a broad production program, including incandescent lamp reflectors from 0.5 to 10 kw, cutting tables, power rewinds, counters, curtain drives, etc.

The Polish motion-picture research

agency, FBT, beside its development activity, produces in its experimental workshops short series of highly specialized equipment, for example, magnetic 35mm recorders, magnetic heads, cinema amplifiers, test instruments for cinema servicing, etc. Other products like lenses, mirrors, rectifiers and projection-booth equipment are made in various factories.

Research and development activity is mainly based on the program of the FBT, although other organizations such as studios and the central processing laboratory also contribute. FBT has its own building adapted for the needs of the various sections dealing with optics, illumination engineering, sensitometry, acoustics, and sound engineering, chemistry and physics.

FBT also has experimental workshops where pilot models of specialized products can be made. Among the achievements of the FBT and other organizations are the introduction of full magnetic sound recording in all Polish film studios; the extended use of color and knowledge of color techniques; wide-screen and stereophonic sound techniques, including CinemaScope; the raising of film projection standards; the production of new light-sensitive materials, and the production of magnetic film and tape.

Film Production—Sound Equipment: The production of 35mm magnetic recorders was begun by the FBT in 1958. This recorder is based on modern requirements and principles. It consists of two units — drive mechanism unit and amplifier unit (Fig. 98 and 99). The drive mechanism is comprised of three motors, and the main synchronous motor has two speeds. In this way the magnetic film can be moved forward and backward at a normal speed of 24 frames/sec, or at a speed



Fig. 99. Amplifier unit for the magnetic recorder 35mm.

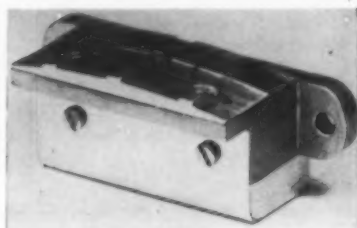


Fig. 100. Magnetic head unit with changeable poletips.

of 48 frames/sec. The film, after removal from the sprocket drum, can be rewound at high speed, reaching 300 m/min.

The starting and stopping of the recorder can be done through a remote-control circuit. The recorder may be used with 35mm or 17.5mm film without further adjustment. The amplifier unit comprises all circuits for recording, reproducing and erasing. Output and input voltage — 0.775 v, 600 ohm.

The FBT Magnetic Recorder may be delivered as 1-channel or 4-channel stereophonic equipment. Specially constructed magnetic heads are precisely positioned in a single mount and have replaceable pole tips. This system permits the maintenance of satisfactory record and reproduce characteristics (Fig. 100).

FBT also makes 16/32mm magnetic sound-recording equipment recording on 16mm magnetic film or on magnetic tracks on 16mm reprints. The equipment can be coupled with a 35mm magnetic channel or re-recording machines. Recordings can be made simultaneously on more than one 16mm print. In this case, necessary synchronism is maintained by an electrical coupling between the recorder-drive motors.

Mechanical specifications of the 16/32mm equipment are similar to those of the 35mm recorder, e.g. two-speed synchronous drive, high-speed rewind, etc. Output and input level: 0.775 v, 600 ohm.

The necessary supplement of the magnetic recorders is the mixing console, made in two types, 2-channel and 4-channel. The console has interchangeable

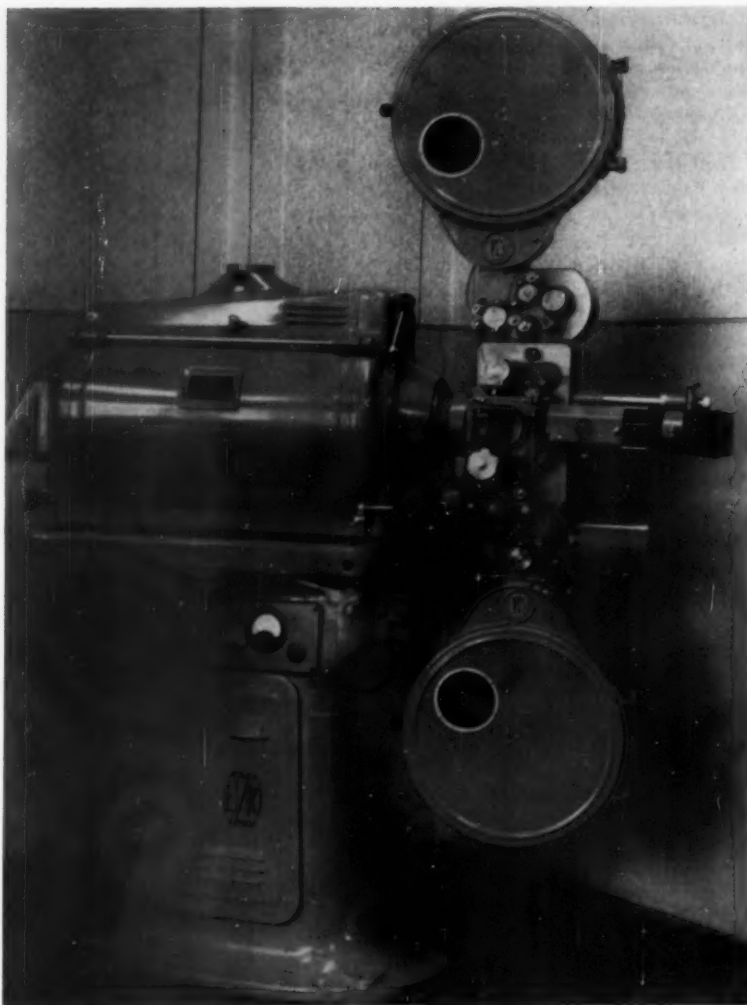


Fig. 101. 35mm projector type A.P. 5 with the four-track magnetic head and anamorphic lens.

cases, new flat-level regulators and universal equalizer, making possible a variety of transfer characteristics.

The series of magnetic heads was extended in 1958 by the addition of new heads in block mounts and with replaceable pole tips. The block mount comprises record, reproduce and erase heads. Miniature heads and stereophonic heads of all types are also manufactured.

A vertical two-way cutting table has been made in the Film Equipment Factory in Warsaw since 1956, and recently improved. The film transport with the optical system is based on polygonal prisms, giving a bright picture. The lens has an anamorphic attachment in the ratio of 1:2.35. The film can be driven manually or by motor, with quick rewind forwards and backwards, and regulated by foot or by hand. The sound can be reproduced from optical, or magnetic, 1- or 4-channel tracks. All controls are handily located.

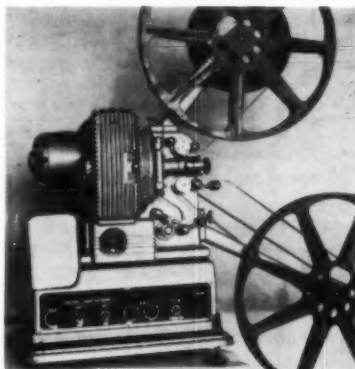


Fig. 102. 16mm projector type A.P. 12.

Motion-Picture Theater Equipment: The latest-model 35mm projector, Type AP-5 produced by the Cinematographic Factory (LZK) in Lodz, is suitable for medium-size cinemas with normal and wide

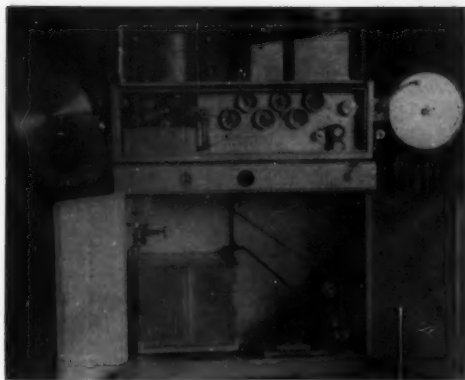


Fig. 103. Print cleaning machine type R 03.



Fig. 104. Protective coating and renovation machine type R 6.1.

screen (CinemaScope) (Fig. 101). The projector is equipped with anamorphic attachment and 4-track magnetic soundhead. The high-intensity arc lamp takes a maximum current of 80 amp. The same soundheads may be used for other makes of projectors. The increasing demand for higher standards of sound reproduction in cinemas can now be satisfied by the new double-amplifier unit produced by FBT, with a maximum power output of 20 v, designed principally for medium- and large-size theaters. An independent development of FBT is a high-fidelity universal, stereophonic, optical-magnetic, reproducing amplifier unit. The equipment consists of magnetic soundheads, separate preamplifiers designed for placing between the projectors (on the front wall of the projection booth), four similar amplifiers in the rack, the main loudspeakers, effects loudspeakers and control speakers.

16mm projectors are also produced in the Cinematographic Factory in Lodz. The new model AP 12 is designed especially for conditions in rural cinemas (Fig. 102). The amplifier is located in the mechanism base. The complete installation includes loudspeaker, transformer and three carrying cases. High luminous output, quality lens and high-fidelity sound channel permit professional standards of projection and sound reproduction in cinemas up to 400 seats. Control instruments and tools for adjustment of the picture and sound channels are also made at the Lodz factory, including basic test films (35mm and 16mm), autocollimator for adjusting the optical axis in the projector, portable output power meter, and reflected light meter for measuring the reflection factor of screens and mirrors.

Recently, plastic material made from Polish raw materials has been used for lenticular screens with a brightness factor of 1.7-2.

The FBT also has a print-cleaning machine and universal coating machine. The print-cleaning machine, Type R 03,

produced by the Film Equipment Factory in Warsaw, is a high-output machine for 35mm and 16mm film (Fig. 103). The cleaning operation consists of mechanical and chemical processes. Both 35mm and 16mm prints can be accommodated simultaneously or independently, in two separate chambers. A significant characteristic of the machine is the rapid filtering of the cleaning agent. The output of clean prints reaches 2×1500 m/hr. The Type R 6.1 protective coating and rejuvenation machine produced by FBT puts a lacquer preservative on the emulsion side of the film and removes or reduces mechanical defects on both sides of the prints (Fig. 104). The high output of 1500 m/hr makes possible efficient operation simultaneously on the two print sides during one film passage through the machine. The equipment is universal and may be used either with cleaning solutions or lacquering compounds. The Film Equipment Factory in Warsaw produces auxiliary film equipment for developing laboratories such as motor rewinds, table rewinds, picture-and-sound editing table, counters, etc.

Sweden

Two-Track Magoptical 35mm Print: The two-track magoptical release print as decided in ISO-Harrogate-58 Resolution No. 9 has been tried in a few Swedish productions during 1958. This is characterized by regular positive perforations, a regular optical soundtrack and two magnetic soundtracks outside the perforations. The first producer to use the new medium was Arne Sucksdorff, who for the Cannes festival made a special print of his film *The Flute and the Arrow*. This film was awarded a special prize for high technical quality. The first general release using the new system was made by AB Svensk Filmindustri with the feature *The Jazzboy*, directed by Hasse Ekman.

The novelty in the sound as recorded in these pictures is the use not only of one main track but also of one effects track

rather than the attempt to record stereophonic sound. The main track is reproduced on the screen speakers and the effects track gives an acoustic envelope in the theater. For this reason much more care and consideration have been given to the positioning of the effects speakers in the theater than has been practiced in previous systems. The most astoundingly realistic effects can be reproduced this way without impairing the intelligibility of speech reproduced through the main channel. Thunder, street noise, sounds in the woods and fields and also music can be reproduced at a higher level than possible when a single track is used. It is obvious from the acceptance which this system has received by the audience and the press that it gives a very good alternative to the more elaborate three-channel stereophonic sound.

Cinemascope Photography: During 1958 eight pictures have been released in CinemaScope format, using the Agascope lens, manufactured in Sweden. This lens has given excellent results. It is now also available in 210mm focal width. This size is interesting in that it differs in design from the previous 50-, 75- and 105mm lenses in the use of inversed anamorphic system, which instead of compressing the picture sideways stretches it vertically. Thus the backing lens of this system has 105mm focal width, which gives certain optical advantages.

Wide-Screen Systems: CinemaScope is fully accepted in Sweden and presently more than 1100 theaters are equipped to project CinemaScope pictures compressed 2:1. Magnetic sound in theaters is not widely accepted. Only about 80 theaters are equipped. Mostly films of standard format are shown in the picture ratio 1.75:1, but there is a tendency against this on the production side. One producer has decided to produce for 1.36:1 and for CinemaScope format only.

One theater, the Vinterpalatset, in Stockholm opened the Cinemiracle show *Windjammer* during 1958, which has been well accepted by the public. Also it is known that at least two Todd-AO theaters will be opened during 1959.

Historical Events: At the yearly general meeting of Svenska Filmsamfundet in the fall of 1958 there was a demonstration made of a short film (projection time one minute) photographed in Stockholm in August 1896. This film was at that time produced and photographed by a man named Max Skladanowsky and shot with a camera built by himself.

His negative was 55mm wide and the picture area 39 by 26.5mm. A sample copy of this original was shown. The perforations, two to each picture frame, were eyeletted to reduce wear. The son of Max Skladanowsky, Erik Skladanowsky, now living in eastern Berlin, who did the demonstration, said that his father had made his first demonstration on the 1st of November, 1895.

Color: A comparatively large number of color films have been produced in Sweden during 1958. Of the total production of 23, 10 are in color. The change is even more pronounced in industrial and advertising films, which are all produced in color. Presently the only color system of importance for professional films is the Eastman color system. The professional use of Kodachrome is increasing but will probably partly change to Ektachrome 16mm, when a laboratory is opened for processing during 1959.

The leading laboratory, Filmteknik, is equipped for optical reduction to 16mm and 8mm film and is equipped for optical printing of CinemaScope to normal format and the reverse. The experience in the use of daylight machines of Swedish design for printing and developing color as well as black-and-white film is very positive.

Television: Swedish television is expanding rapidly. Regular official telecasting started in October 1956 in Stockholm. There are now 275,000 receivers in use for which an annual fee of Swedish Crowns 100 (\$20) a year is being paid.

Swedish television is organized in two sections: a program-production section under the Swedish Broadcasting Corp., and a transmitting section handled by the Telegraph Administration. Today there is one reversible microwave link connecting the capital, Stockholm, on the east coast with Gothenburg on the west coast, and continuing to the city of Malmö in the southern part of Sweden. There is one branch from Stockholm north to Gävle. Malmö forms the connecting point with Copenhagen and the Eurovision link system.

The Swedish network now has 13

transmitters in operation, bringing TV reception to nearly two-thirds of the population. These transmitters are located in the closely populated areas of southern Sweden. Before July 1, 1960, there will be 20 more transmitters on the air.

The main center of the TV system is in Stockholm, where there are three studios in operation: studio A of 4400 sq ft and 4 iko (German make); B of 4400 sq ft and 4 iko (German); and C of 340 sq ft theater stage with 600 seats and 4 image orthicons (German). One vidicon camera for announcement is used. In Gothenburg one small studio is in use with 3 image orthicons (English). Mobile units are located in Stockholm with 4 image orthicons (German) and in Gothenburg with 3 image orthicons (English). Malmö has one studio under construction.

One dozen French microwave links are used for OB (remote pickup) and a dozen Arriflex 16mm film cameras, two 16mm Auricon cameras with magnetic sound. A pilot-system is used for synchronizing pictures with magnetic sound; and a perforated magnetic-tape recorder is used for final sound played back in scanners. There are also two 35mm flying-spot scanners (German), two 16mm flying-spot scanners (German) and two 16mm vidicon scanners (U.S.), etc. Four camera crews work in Stockholm and one in Gothenburg. A total of 220 people are employed in the Technical Dept. That figure includes personnel engaged in handling film and staffing mobile units and also decorators, carpenters, electricians and propmen. In January 1959 there will be 18-20 hours of telecasting per week.

Superimposed Titles on Foreign Films: A special flying-spot scanner is used to produce a television picture with white letters on a dark background. The texts and letters are photographed on regular 35mm film one at a time. In this way a series of 35mm still pictures is produced with the appropriate interpretation of the original speech.

In order to move forward the right title at the right moment, a special mechanical 16mm servo-film is used. This servo-film has certain mechanical markings, is driven by means of a special unit mounted directly on the projector for 16mm or 35mm film. Any time there is a mark on the servo-film, a new text picture is put in front of the flying-spot text scanner. This arrangement will be developed into a professional system. For the time being the experimental model is in use.

U.S.S.R.

This year another attempt was made to get a direct report covering the activities of the U.S.S.R. in television and motion pictures. We feel it is unfortunate

that no report was given because there is apparently a lot of activity if we are to judge from information coming from people visiting the Soviet Union. We shall try again for a direct report.

In television, one visitor reports that in general the Soviets were 10 years behind the U.S.A.¹⁹⁷ It was reported that video tape was beyond the experimental stage.¹⁹⁸

By the end of 1958 it was expected that one out of three persons would be in range of one of the 62 TV centers. This would cover over 80 million citizens of the Soviet Union.¹⁹⁹

A 1640-ft mast of reinforced concrete is to be constructed for Moscow's television center. It will contain two elevators for sightseeing purposes.²⁰⁰

Most motion-picture engineers are trained by the Leningrad Institute of Cinematograph Engineers. This includes mechanical, electro-technical, and chemical technology.²⁰¹

In the field of emulsion theory, the West and the East are pretty much in agreement.²⁰²

A Soviet movie company planned to shoot a film in Greece on Homer's *Iliad* at a cost of 8½ million dollars.²⁰³

Agreements were made between the United States and the Soviet Union for the exchange of several feature pictures.²⁰⁴

A report containing observations on television in Russia was made to the State Department by Edward W. Allen, Chief Engineer, Federal Communications Commission. The 12-page document, identified as TD Serial No. 883, CCIR Document No. 14, Study Group XI, is available from the State Department's Telecommunications Div. The report states that 41 TV transmitters were operating at the time (about midsummer) the report was presented, with 60 scheduled to be in use by the end of 1958, and 100 by 1960. One and a half million sets are in use, one million of them in Moscow, most of them with 12-in. round tubes.

Color TV has been demonstrated in Moscow and Leningrad.²⁰⁵

Venezuela

During 1958 the motion-picture industry in Venezuela changed very little. In spite of political changes which checked the growth of the motion-picture industry, some small companies developed. At the present time there are about 650 theaters in Venezuela representing an appreciable increase over last year. There are two new first-run theaters in Caracas. One of these two theaters is equipped with Philips 70-35mm projectors.

After the new Constitutional Government took power, the Congress started to study a project for issuing a new law protecting the national motion-picture industry and requiring the exhibitors to



Fig. 105. Students learn from educational programs produced by Audio-Visual Center, Caracas.

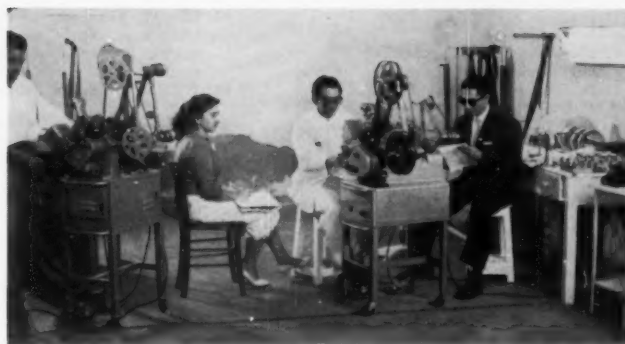


Fig. 106. Editing Dept., Audio-Visual Center, Caracas (Moviola equipment).

exhibit motion pictures of national production. It is expected that with this new law a number of new producers and companies will appear. Although Venezuela has companies completely equipped to produce all types of motion pictures, such were not produced for lack of Government support.

During 1958 there were exhibited motion pictures produced in the United States, Great Britain, Soviet Union, Germany, France, Italy and Czechoslovakia. Festivals of Russian, French and Italian motion pictures were presented in Caracas. One long feature was also produced in 1958.

The Audio-Visual Center, sponsored by the Ministry of Education, was inaugurated a short time ago. This is a unique center in Venezuela and its main objective is to produce educational motion pictures through television (Fig. 105). In the future this Center plans to have laboratories and sound and editing departments completely equipped (Fig. 106). This Center also produces strip

films and daily half-hour TV programs teaching reading and writing. It also produced a 2000-ft documentary in Eastman color. Venezuela is the first country in Latin America to produce educational television.

Caribe Films is installing modern laboratories housed in a specially constructed two-story building. A color processing machine, by André Debré, Model D.U.C. 20 Type N, for processing 35 and 16mm color has been installed. Services for black-and-white will also be offered and cutting rooms will be rented to independent producers. The laboratories are expected to be in full operation by the middle of this year.

Bolivar Films purchased the subsidiary of Radio Caracas TV, Tele Films, and therefore they now have four Houston-Fearless processing machines for producing television news. Bolivar Films has been modernized and Magnasync sound equipment has been installed (Fig. 107). Scanscope anamorphic lenses are used in the cameras.

One TV channel was added to the five already existing in Venezuela, Radio Valencia TV Channel 13, which is equipped with Marconi equipment from England. They have a studio with three cameras from the same firm.

Gama Films has added to its equipment a German-made Union optical reducer 35-16mm (Fig. 108).

Conclusion

Your chairman and the Society extend their thanks to all of those who have contributed to this report — and they are many. It is hoped that contributors who are not committee members are identified throughout. You, the reader, we hope will find the report interesting and of some benefit.



Fig. 107. Bolivar Films sound equipment including Magnasync dubbers and recorders and Reeves optical recorder and amplifiers.

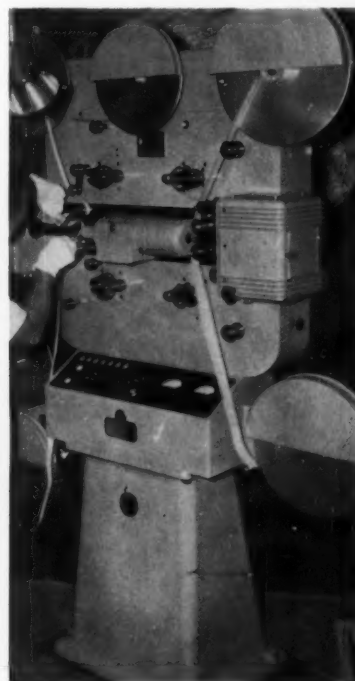


Fig. 108. German-made Union optical reducer-printer used at Gama Films.

References

1. *Am. Cinemat.*, p. 31, Jan. 1959.
2. *Am. Cinemat.*, p. 685, Dec. 1958.
3. *Radio and TV Daily*, p. 6, Feb. 25, 1959.
4. *Business Week*, p. 55, May 17, 1958.
5. *Prog. Comm. Rep. for 1957*, *Journal*, 67: 290, May 1958.
6. *Boxoffice*, pp. 29-34, Apr. 14, 1958.
7. *Kansas City Star*, Mar. 18, 1959.
8. *Mot. Pic. Daily*, p. 1, Mar. 19, 1959.
9. *Mot. Pic. Daily*, p. 1, Feb. 4, 1959.
10. *Am. Cinemat.*, pp. 294-296, 318-319, May 1958.
11. *Kinemat. Weekly*, Supplement i, May 8, 1958.
12. *St. Louis Globe-Democrat*, Dec. 15, 1958; *Boxoffice*, p. 16, Dec. 22, 1958.
13. Ray Fernstrom, "Shooting a film for the fair," *Am. Cinemat.*, 39: 92-93, 114-116, Feb. 1958.
14. Gordon Henry Cook, "35mm camera lenses," *Journal*, 67: 534-536, Aug. 1958.
15. Frederick Foster, "New lenses for the 16mm professional," *Am. Cinemat.*, 39: 698, 700, 724, Dec. 1958.
16. *New Prod.*, *Journal*, 67: 719, Oct. 1958.
17. *What's New*, *Am. Cinemat.*, 39: 466, Aug. 1958.
18. *New Prod.*, *Journal*, 67: 652, Sept. 1958.
19. *What's New*, *Am. Cinemat.*, 39: 466, Aug. 1958.
20. *New Prod.*, *Photo Dealer*, p. 62, Oct. 1958.
21. *What's New*, *Pop. Photo*, 42: 44, Apr. 1958.
22. *New Prod.*, *Journal*, 67: 354, May 1958.
23. J. D. Hayca, "A new series of lenses for vidicon-type cameras," *Journal*, 67: 593-595, Sept. 1958.
24. Gordon Henry Cook, "Vidicon camera lenses," *Journal*, 67: 596-598, Sept. 1958.
25. *New Prod.*, *Journal*, 67: 214, Mar. 1958.
26. *New Prod.*, *Journal*, 67: 354, May 1958.
27. *New Prod.*, *U. S. Camera*, 21: 108, Nov. 1958.
28. *New Prod.*, *Mod. Photo*, 22: 126, Jan. 1958.
29. *New Prod.*, *Mod. Photo*, 22: 32, Nov. 1958.
30. *New Prod.*, *Journal*, 67: 434, June 1958.
31. *What's New*, *Am. Cinemat.*, 39: 666, Dec. 1958.
32. *New Prod.*, *Journal*, 67: 717, Oct. 1958.
33. *Int. Project*, 33: 11, Feb. 1958.
34. *New Prod.*, *Journal*, 67: 278, Apr. 1958.
35. Vern W. Palen, "A newly designed optical printer," *Journal*, 67: 98-102, Feb. 1958.
36. *New Prod.*, *Journal*, 67: 434, June 1958.
37. *Technicalia Photo*, *Photo. Sci. & Eng.*, 2: 181, Oct. 1958.
38. Karl Freund, "Improved television viewfinder for motion-picture production," *Journal*, 67: 745-746, Nov. 1958.
39. *New Prod.*, *Journal*, 67: 507, July 1958.
40. *New Prod.*, *Journal*, 67: 798, Nov. 1958.
41. *New Prod.*, *U. S. Camera*, 21: 84, Sept. 1958.
42. *Mot. Pic. Daily*, Jan. 29, 1959.
43. *New Prod.*, *Journal*, 67: 350, May 1958.
44. *Mot. Pic. Daily*, p. 2, Jan. 29, 1959.
45. Russell J. Ayling and Arthur J. Hatch, "Improvements in the blown arc for projection," *Journal*, 67: 693-695, Oct. 1958.
46. *New Prod.*, *Journal*, 68: Jan. 1959.
47. Vern W. Palen, "Integrated design of animated film equipment," *Journal*, 66: 197-204, Apr. 1957.
48. *New Prod.*, *Journal*, 66: 230, Apr. 1957.
49. *Photographic Engineering*, 6: No. 3, 1955.
50. *New Prod.*, *Journal*, 67: 360, May 1958.
51. *New Prod.*, *Journal*, 67: 362, May 1958.
52. *New Prod.*, *Journal*, 67: 126, Feb. 1958.
53. *News and Reports*, *Journal*, 67: 492, July 1958.
54. *Mot. Pic. Res. Council Bull.* 58.851.
55. *Mot. Pic. Res. Council Bull.* 58.867.
56. *Upson Board*, Upson Co., Lockport, N.Y.
57. *PlyVeneer*, Weyerhaeuser Timber Co., Tacoma, Wash.
58. *Videne*, Goodyear Tire & Rubber Co., Akron, Ohio.
59. *Polyax*, Union Carbide Chemicals Co., New York.
60. *Polytron Corp.*, Berkeley, Calif.
61. *Mot. Pic. Res. Council Bull.* 59.300.31.
62. William R. Needs and George Gill, "A flexible lighting system for a television studio," *Journal*, 68: 124-126, Mar. 1959.
63. William R. Riches, *Journal*, 68: 127-129, Mar. 1959.
64. *Radio and TV Daily*, p. 7, Feb. 2, 1959.
65. *Bus. Week*, p. 83, Dec. 6, 1958.
66. *New Prod.*, *Journal*, 67: 430, June 1958.
67. "Quality newsfilm sound through oxide striping method," *Broadcasting*, June 2, 1958.
68. John A. Maurer, "Technical opportunities in the 16mm and 8mm fields," *Journal*, 65: 586-590, Nov. 1956.
69. John A. Maurer, "Improvements in Variable-Density Recording," presented at the Society's Fall Convention at Philadelphia.
70. *Bus. Week*, p. 52, June 7, 1958.
71. *Electronics*, p. 58, Jan. 16, 1959.
72. *New Prod.*, *Journal*, 67: 558, Aug. 1958.
73. Mervin W. LaRue, Jr., John P. Bagby, Stephen F. Bushman, Stanley R. Freeland and David M. McMillan, "A direct-drive automatic iris control," *Journal*, 67: 600-604, Sept. 1958.
74. *Photo. Trade News*, p. 30, Oct. 1958.
75. Stanley W. Bowler, "Developments and trends at this year's Photokina," *Brit. Jour. Phot.*, 602-604, Nov. 7, 1958.
76. *New Prod.*, *Journal*, 67: 652, Sept. 1958.
77. *New Prod.*, *Journal*, 67: 719, Oct. 1958.
78. *Indus. Photo*, p. 65, May 1958.
79. *Photo Trade World*, Nov. 1958.
80. *New Prod.*, *Journal*, 67: 719, Oct. 1958.
81. *New Prod.*, *Journal*, 67: 438, June 1958.
82. *New Prod.*, *Journal*, 68: 198, Mar. 1959.
83. *Photo. Trade News*, p. 20, Dec. 1958.
84. *Indus. Photo*, p. 74, Oct. 1958.
85. *New Prod.*, *Journal*, 67: 352, May 1958.
86. *New Prod.*, *Journal*, 67: 354, May 1958.
87. *Indus. Photo*, p. 77, Apr. 1958.
88. *Dominion Bureau of Statistics*, Canadian National Library, and Graeme Fraser, Crawley Films, Ltd.
89. CINE (Committee on Non-Theatrical Film Events), 1201 16th St., N. W., Washington 6, D. C.
90. AVCOPI (Audio-Visual Commission on Public Information), 250 West 57th St., New York 19.
91. *Film World Magazine*, p. 150, Mar. 1958.
92. F. A. Denz, "New trends in low-cost in-plant film production" presented at the Society's Fall Convention at Detroit.
93. *Tape Recording*, p. 34, July 1958.
94. *New Prod.*, *Journal*, 67: 555, Aug. 1958.
95. *New Prod.*, *Journal*, 67: 435, June 1958.
96. *New Prod.*, *Journal*, 67: 356, May 1958.
97. *New Prod.*, *Journal*, 67: 283, Apr. 1958.
98. *New Prod.*, *Journal*, 67: 356, May 1958.
99. *Bus. Week*, p. 106, July 1958.
100. G. R. Crane and E. W. Templin, "A portable sprocket-type magnetic tape or film recording system," *Journal*, 67: 754-757, Nov. 1958.
101. Lee R. Askren and Raymond J. Dwyer, "Recording lip-synchronized sound using a 16mm magnetic-optical sound projector," *Journal*, 67: 32-34, Jan. 1958.
102. Edward P. Kennedy, "Studio and portable systems for synchronizing 1/4-inch magnetic tape with perforated motion-picture film," *Journal*, 67: 95-97, Feb. 1958.
103. Heinz Kronenberger, "Siemens dual-strip 16/16 projector with synchronous motor," abstract, *Journal*, 67: 486, July 1958.
104. John B. McCullough and Joseph E. Aiken, "Joseph T. Tykociner: pioneer in sound recording," *Journal*, 67: 520-523, Aug. 1958.
105. Russell J. Tinkham, "Magnetic recording media considerations for improving masters and dubs," *Journal*, 67: 662-665, Oct. 1958.
106. Malcolm G. Townsley, "International standardization of Magnetic sound on film—a status report," *Journal*, 67: 822-823, Dec. 1958.
107. *New Prod.*, *Journal*, 67: 555, Aug. 1958.
108. *New Prod.*, *Journal*, 67: 279, Apr. 1958.
109. G. A. Brookes and H. A. Manley, "A versatile photographic system for studio use," *Journal*, 67: 666-672, Oct. 1958.
110. *New Prod.*, *Journal*, 67: 796, Nov. 1958.
111. Harry F. Olson and John Preston, "The electrostatic uniaxial microphone," *Journal*, 67: 750-753, Nov. 1958.
112. J. L. Forrest, "16mm Super Anscochrome films," *Journal*, 67: 691-693, Oct. 1958.
113. N. H. Groet, M. Liberman and F. F. Richey, "An improved professional 16mm reversal camera film," *Journal*, 68: 8-10, Jan. 1959.
114. Deane S. Thomas, Jr., Howard W. Vogt and Herbert L. Rees, "The processing of an improved professional 16mm reversal color camera film," presented at the Society's Convention in Los Angeles, April 23, 1958. (Manuals and instructions are available from Eastman Kodak Co.)
115. *New Prod.*, *Journal*, 67: 354, May 1958.
116. *Film and AV World*, 14: 128, Mar. 1958.
117. Hans-Christoph Wohlrab, "A new automatic light control for additive color printing," presented at the Society's 1957 Fall Convention at Philadelphia and to be published in an early issue of the *Journal*.
118. *New Prod.*, *Journal*, 67: 218, Mar. 1958.
119. *New Prod.*, *Journal*, 67: 650, Sept. 1958.
120. *New Prod.*, *Journal*, 67: 650, Sept. 1958.
121. *New Prod.*, *Journal*, 67: 360, May 1958.
122. *New Prod.*, *Journal*, 67: 533, Aug. 1958.
123. Nicholas J. Cedrone, "A silver-recovery apparatus for operation at high current densities," *Journal*, 67: 172-174, Mar. 1958.
124. *New Prod.*, *Journal*, 67: 204, Mar. 1959.
125. *New Prod.*, *Journal*, 67: 651, Sept. 1958.
126. *New Prod.*, *Journal*, 67: 213, Mar. 1958.
127. *New Prod.*, *Journal*, 67: 436, June 1958.
128. *New Prod.*, *Journal*, 67: 438, June 1958.
129. *New Prod.*, *Journal*, 67: 437, June 1958.
130. Howard F. Ott, "Dirt-free exhaust hood for cleaning film," *Journal*, 67: 689-690, Oct. 1958.
131. *New Prod.*, *Journal*, 67: 718, Oct. 1958.
132. *New Prod.*, *Journal*, 67: 354, May 1958.
133. *New Prod.*, *Journal*, 68: 104, Feb. 1959.
134. *New Prod.*, *Journal*, 67: 220, Mar. 1958.
135. *New Prod.*, *Journal*, 67: 124, Feb. 1958.
136. *PMI*, pp. 53-54, Sept. 1958.
137. *Film News*, 17: 10-11, 22, Winter 1957-58.
138. *TV Digest*, p. 12, Nov. 8, 1958.
139. *New Prod.*, *Journal*, 68: 204, Mar. 1959.
140. *Kansas City Star*.
141. E. P. Martz, Jr., "Visibility: detection and recording of objects against a sky background," *Journal*, 67: 228-231, Apr. 1958.
142. H. C. Schepler, "Atmospheric optics," *Journal*, 67: 225-227, Apr. 1958.
143. Seibert Q. Duntley, "Atmospheric limitations on missile photography," *Journal*, 67: 231-233, Apr. 1958.
144. Floyd A. Kinder, "Flying camera stations," *Journal*, 67: 234-237, Apr. 1958.
145. A. H. Schendel, "Optical tracking instrumentation," *Journal*, 67: 237-241, Apr. 1958.
146. John A. Clemente, "A design and operational philosophy for an ultra-precision tracking mount system for a missile test range," *Journal*, 67: 242-245, Apr. 1958.
147. H. C. Schepler, "Photographic instrumentation at the Air Proving Ground Center," *Journal*, 67: 246-248, Apr. 1958.
148. George Economou, Vladimir Luban and Morton Mehr, "Automatic-exposure control for a high-resolution camera," *Journal*, 67: 249-251, Apr. 1958.
149. Sidney M. Lipton, Chairman, "Discussion on missile photography," *Journal*, 67: 252-255, Apr. 1958.
150. Hutson K. Howell, "Photographic emulsions for missile photography," *Phot. Sci. & Eng.*, 2: 95-104, Aug. 1958.
151. K. H. Lohse, "Color exposure for high-speed photography of some self-luminous events," *Journal*, 67: 567-571, Sept. 1958.
152. K. H. Lohse, and B. M. Larsen, "Too hot and too fast," *Indus. Phot.*, 7: 20-21, Sept. 1958.

153. James Hughes, "Photographic spray analysis," *Indus. Phot.*, 7: 8-19, Oct. 1958.
154. New Prod., *Journal*, 67: 358, May 1958.
155. New Prod., *Journal*, 67: 124, Feb. 1958.
156. *Pop. Phot.*, 43: July 1958.
157. *Machine Design*, p. 35, Aug. 7, 1958.
158. *Television Digest*, p. 16, Feb. 28, 1959.
159. *U. S. News & World Report*, pp. 73-75, Oct. 3, 1958.
160. Francis E. Almstead, *Rochester, N. Y. Democrat and Chronicle*, Feb. 9, 1959.
161. *U. S. News & World Report*, p. 8, Dec. 12, 1958.
162. *New York Times*, Nov. 4, 1958.
163. Bendell, Kozanowski and Shipferling, "How to get the best performance out of the TK-41 color cameras," *Broadcast News*, 101: 44, Aug. 1958.
164. New Prod., *Journal*, 67: 210, Mar. 1958.
165. *Broadcast News*, 99: 6, Feb. 1958; *Broadcast News*, 100: 6, Aug. 1958.
166. *Broadcast News*, 102: 60, Oct. 1958.
167. New Prod., *Journal*, 68: 104, Feb. 1958.
168. *Radio-TV Daily*, 6, June 6, 1958.
169. *Electronics*, p. 8, Sept. 12, 1958.
170. New Prod., *Journal*, 67: 558, Aug. 1958.
171. New Prod., *Journal*, 67: 798, Nov. 1958.
172. New Prod., *Journal*, 68: 104, Feb. 1959.
173. *Radio-TV Daily*, p. 9, Nov. 3, 1958.
174. *Radio-TV Daily*, p. 7, Aug. 4, 1958.
175. *Radio-TV Daily*, p. 7, Aug. 4, 1958.
176. New Prod., *Journal*, 67: 507, July 1958.
177. *Ed. Ind. News, Journal*, 67: 417, June 1958; *Bus. Week*, p. 55, May 31, 1958.
178. *Fernsehtationen in der U.S.S.R. in Jahr 1960*. ETZ-B, p. 401, Nr. 10, 1958.
179. *Progress Com. Report for 1957, Journal*, 67: 310, May 1958.
180. *Fortschritte der Fernsehtechnik. Technische Rundschau*, p. 41, Nov. 7, 1958.
181. Swiss PTT, *Schweizer Fernsehen*, Oct. 1958.
182. *Photo Trade World*, 18: 418-419, Dec. 1957.
183. Chester, E. Beachell, "Notes on the sprocket-etape magnetic sound recording system," *Journal*, 66: 742-745, Dec. 1957.
184. *Radio-TV Daily*, p. 5, Jan. 9, 1959.
185. A. Coutant, "La caméra de prise de vues double-bande," *AFITEC Bull.*, pp. 7-9, 1958; presented at the AFITEC Technical Session of Oct. 30, 1957.
186. New Prod., *Journal*, 67: 198-200, Mar. 1958; also Ed. Richard, "Les effets spéciaux par cache et contre-cache animés," *AFITEC Bull.*, pp. 10-11, 1958, and presented at the AFITEC Technical Session of Oct. 30, 1957.
187. Karl Jacob and Walter Pahl, "Euromat, ein Steuergerät für den automatischen Ablauf einer Kinovorführung," *Kino-Technik*, 12: Oct. 1958.
188. *Brit. Kinemat.*, p. 59, Mar. 1958.
189. L. H. Bacon, "A single system 16mm camera with magnetic recording," *Brit. Kinemat.*, 33: 63-70, Sept. 1958.
190. *Mot. Pic. Daily*, p. 5, Sept. 16, 1958.
191. *Radio-TV Daily*, p. 3, Aug. 12, 1958.
192. *Mot. Pic. Daily*, June 20, 1958, p. 6.
193. *Kansas City Star*, Nov. 5, 1958.
194. *Mot. Pic. Daily*, Nov. 13, 1958, p. 3.
195. *Mot. Pic. Daily*, July 9, 1958, p. 1.
196. *Mot. Pic. Daily*, Jan. 26, 1959, p. 1.
197. *Radio and TV Daily*, p. 1, Dec. 16, 1958.
198. *Radio and TV Daily*, p. 8, Aug. 29, 1958.
199. *Radio and TV Daily*, p. 8, Dec. 11, 1958.
200. *Radio and TV Daily*, p. 1, July 9, 1958.
201. Yu. N. Gorokhovskii, "Zhur nauch i priklad," *Fotografic Kinematografic*, 3: 68-65 Jan./Feb. 1958.
202. K. V. Chibisou, "Zhur nauch i priklad," *Fotografic Kinematografic*, 2: 372-389, Sept./Oct. 1957.
203. *Kansas City Star*, Feb. 1, 1959.
204. *Mot. Pic. Daily*, p. 1, Mar. 20, 1959.
205. *TV Digest*, p. 8, Sept. 20, 1958.

Exchange of Air Defense Information by Closed-Circuit Television

By HOLLIS DAKIN
and PAUL A. J. BUE

A new type of studio vidicon camera has been tested on a closed-circuit microwave TV system. Equipment and techniques used for exchange of radar plotting information between Army and Air Force installations in Norfolk and Cape Charles, Va., are described.

THE APPLICATION of television in the Army encompasses four broad areas: (1) Training; (2) Field, Tactical and Operational; (3) Technical; and (4) Information. The test described below was in the area of information and was designed to demonstrate the feasibility of the use of closed-circuit TV in the exchange of radar information by units of the Air Force and the Army. North American Air Defense Command (NO-RAD) is the combined United States-Canadian organization for air defense of this continent. That defense includes Air Force interceptor aircraft and Army air defense missiles. Coordination of these defense operations includes an exchange of plotting information between the Air Force and the Army.

Sites chosen for the test were the Air Force's Air Defense Direction Center, Cape Charles, Va., and the Army's Air Defense Command Post, Norfolk, Va. (Fig. 1). Each installation receives radar information from its own radars.

Presented on October 23, 1958, at the Society's Convention in Detroit by Lt. Col. Hollis Dakin (who read the paper) and Lt. Paul A. J. Bue, Army Pictorial Center, 35-11 35th Ave., Long Island City 1, N.Y.
(This paper was received on October 29, 1958.)

parent plotting boards and then exchanged verbally by telephone. The

sequence (Fig. 2) is: (1) Air Force radarscope operators at the Air Force site at Cape Charles identify (or spot) flights of aircraft on their radarscopes and, over local headset lines, tell Air Force plotters where to plot the information; (2) an Army man, stationed at the Air Force's Cape Charles site (Fig. 1), then reads plots from the Air Force's

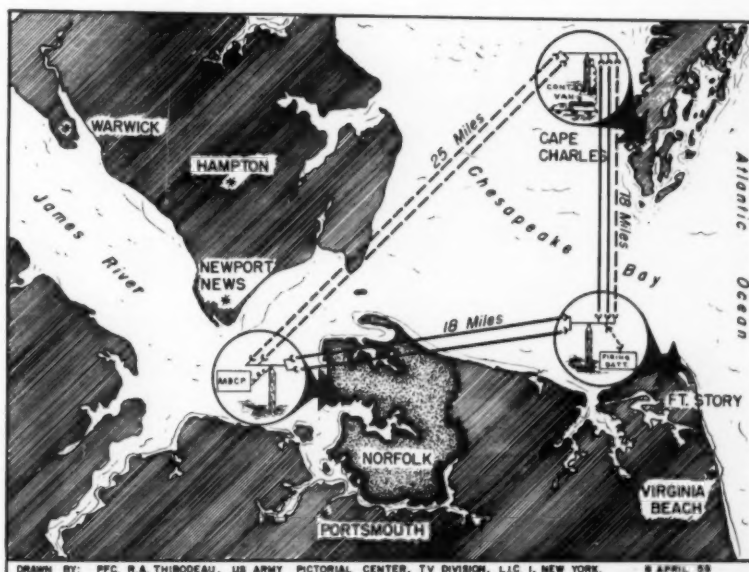


Fig. 1. Map of Cape Charles-Cape Henry-Norfolk area showing initial duplex microwave shot (broken lines) and the final transmission (solid lines) with the relay point at Fort Story and link to firing battery.

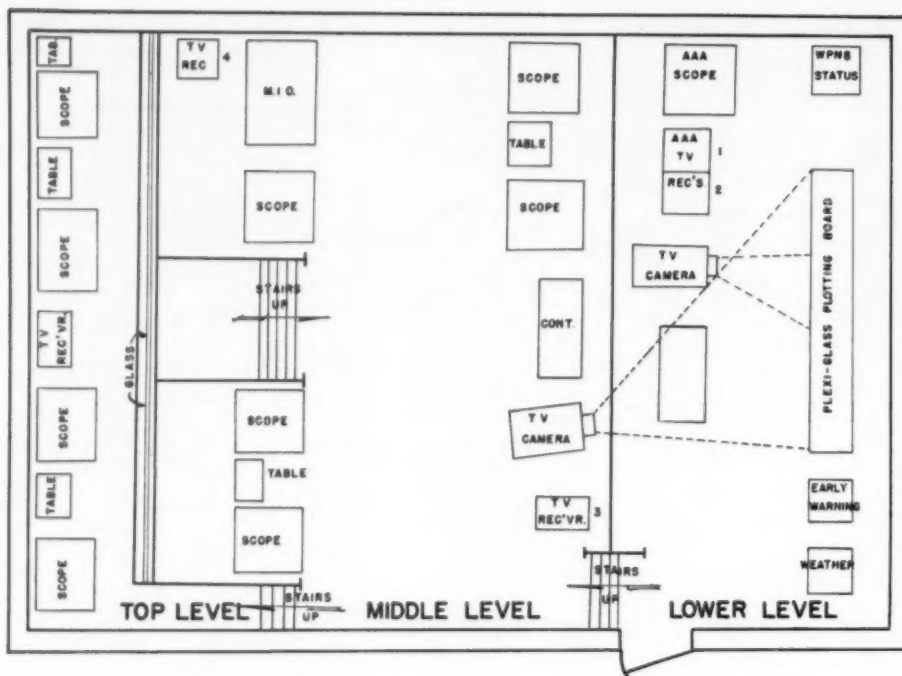


Fig. 2. Layout of Air Defense Direction Center (Air Force) at Cape Charles, Va.

board and *tells* them (by telephone) to the men behind the Army's board at Norfolk (Fig. 3); and (3) Army men then *plot* similar information on the board which can then be *read* by Army operations personnel.

TV Shortens Sequence

The time necessary to complete this sequence could effect a serious distance

error by the time the plot is read in Norfolk. In fact, since Air Force and Army radars overlap in some areas and some flights were being plotted on information from both, it was occasionally difficult to decide whether two plots making adjacent appearances on the Army's board represented two flights of aircraft or two plots of the same flight — an immediate plot from Army

radar information and a second plot from Air Force information arriving by the lengthy spot-tell-plot-read-tell-plot-read sequence.

It had been recognized for some time that if a TV camera were focused on the Air Force's plotting board and its signal fed to a monitor visible to the plotter behind the Army's board, the second *tell* step could be dropped from

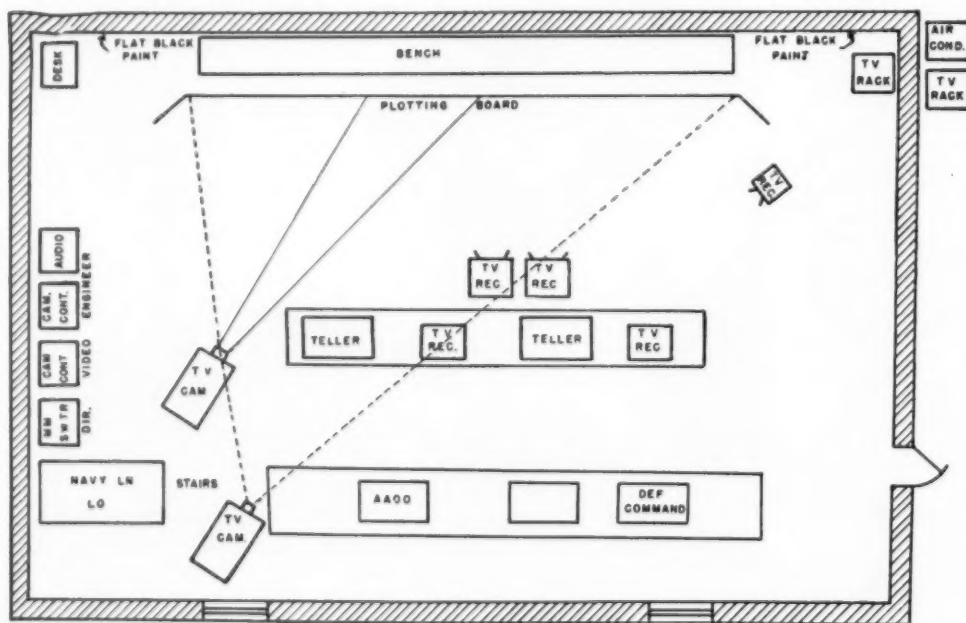


Fig. 3. Layout of Army Air Defense Command Post, Norfolk, Va.

the sequence. This step alone encompasses quite an involved procedure. First the Army man at Cape Charles must read the Air Force plot, then he must explain this plot verbally by telephone to the Army plotter at Norfolk who must then translate the verbal information into a plot for his board. The use of television would enable the Army plotter to see on his monitor the immediate image of the Air Force plot and transcribe it to his own board without any time-consuming verbalization.

An additional benefit derived from the use of closed-circuit TV is that with a two-way system, information from the Army's radars could be supplied to the Air Force to augment and verify information from its radars in much less time. Also, there would be a ready source of information from both plotting boards which could be fed to a common controlling center in the area.

Television Test

Field Unit 2 of the Television Division, Army Pictorial Center, provided the equipment and personnel for the test. When the order from NORAD was received through the Office of the Chief Signal Officer of the Army, the three officers and 14 men comprising the unit set up cameras and monitors at each site and put in the microwave links.

The Cape Charles microwave terminal was erected 270 ft above the ground through the courtesy of the Chesapeake and Potomac Telephone Co. which gave permission for mounting equipment on the tower adjacent to the Air Force site. At Norfolk, the Army built its own tower (Fig. 4), 120 ft high. A few hours after

the microwave had been installed its signal was found to fade badly at intervals. After unsuccessful attempts to discover some pattern to the fading which would relate it to periods of sunshine, to tides, or to shipping in the area, the direct shot was given up and a relay point was installed at Fort Story, on Cape Henry (Fig. 1). By the shorter cross-water distances the fading problem was virtually eliminated. The 7250- to 7400-mc frequencies which were used apparently were more susceptible to reflection cancellations than the lower frequencies used by the telephone company in the same area. Two voice channels were duplexed in each direction in order to furnish an operational and an engineering circuit.

A single link of microwave was also installed from the relay tower to a nearby missile firing battery. By changing the patching of circuits at the relay point, either of the video channels could be monitored in the battery's operations van. It was decided that this additional information was unnecessary so this part of the installation did not figure in the final tests.

For this project, Field Unit 2 had installed studio vidicon-type camera chains, RCA TK-15, with the highly sensitive 7038 vidicon tubes (Fig. 5). This unit had previously provided facilities for staff briefings by TV.*

There had been some misgivings that both permanent and temporary markings on the transparent, edge-lighted plotting boards would not be bright enough

* Hollis Dakin, Frederick L. Martin, Paul A. J. Bue and Jack R. Smith, "Television for parade control and field exercises," *Jour. SMPTE*, 67: 461-463, July 1958.

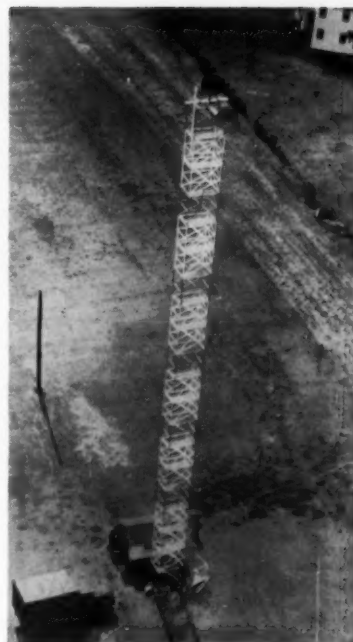


Fig. 4. Microwave tower, constructed by the Army Pictorial Center, at Norfolk, Va.

for successful pictures. However, the combination of carefully selected colors for the paints and pencils, the fluorescent edge lights at Norfolk, and lenses with apertures as large as $f/1.3$ proved very satisfactory (Fig. 6). When used on the incandescent-lighted board at Cape Charles, the same colors were not good enough to register clearly, except at the edges of the board. This deficiency was

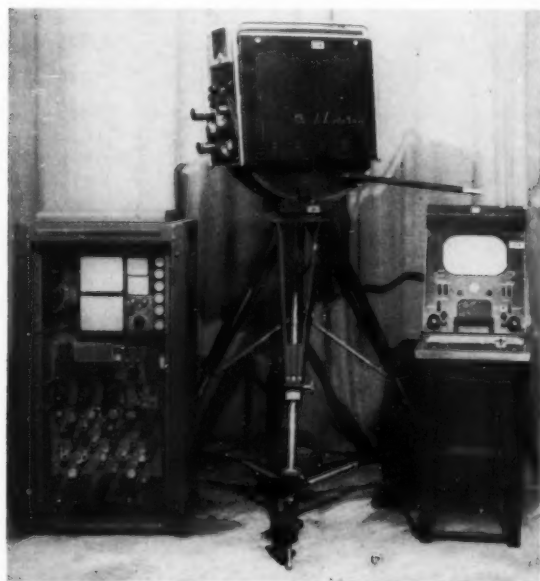


Fig. 5. RCA TK-15 studio vidicon camera chain.

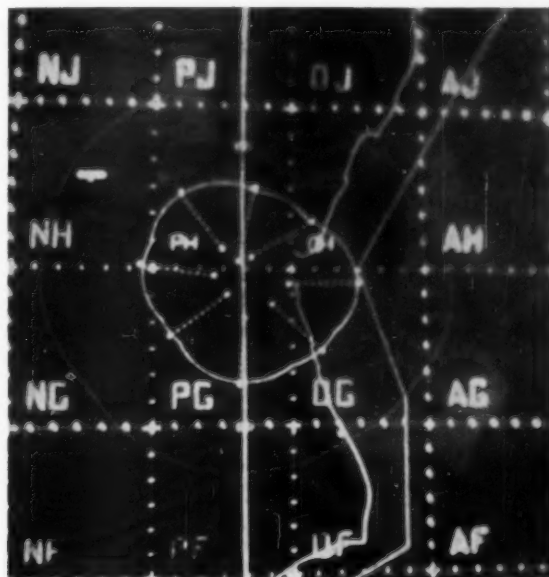


Fig. 6. Monitor display of plotting board.

remedied when the Air Force installed a new board with fluorescent edge lights.

Experiments were conducted with black light and fluorescent pencil markings but these were found unsatisfactory under conditions at the test site.

Installations at both ends of the system were quite similar, consisting of two cameras (one for a long shot of the entire board and one for a close-up), a switcher to select either the long shot or close-up for transmission, a monitor fed from the local cameras, and monitors on which to view the

pictures received from the far end. At the Army site at Norfolk, two of these monitors were set in front of the plotting board in such a position that the plotters could see them through the board, making it unnecessary for the plotters to turn away from the board at any time.

Although there were some periods of relatively poor transmission, operational tests were successful. There is reason to believe that with proper selection of frequencies and sites, fade-free operations can be attained. It was found that the time lag between the appearance of the

plots on the Air Force board and their being copied onto the Army board could be cut to as little as 16% of that required by the telephone telling system. It was quite usual to have cuts down to 25% of the previous time. Decisions on whether adjacent plots represented two actual flights or two different plots of one flight were cut to even smaller proportions.

The test proved that closed-circuit TV could meet the requirements. A decision has still to be reached on whether such a system is economically feasible in that area.

An Integrated Sound Service Studio for the 16mm Producer

By ROBERT W. EBERENZ

After discussion of the physical construction of the new studios, the acoustical treatment and placement of equipment for ease of operation are illustrated with drawings and photographs. Special attention is given to the equipment selected for the studio — the unique new Westrex RA-1581 optical and magnetic recorder and its associated transmission system, including double-speed optical transfer operation and other associated equipment; the new eight-position recording console; looping facilities; and the motor reversing and control system.

EARLY IN 1957, the management of Byron, Inc., decided the existing sound-recording facilities were in need of complete modernization. Existing equipment, though of good quality, was found to be inadequate for the rapidly expanding 16mm market. Facilities were overcrowded and operation was at times nerve wracking. After a thorough study of the situation, it was decided that all existing equipment and plant facilities would be completely replaced. Plans were put in motion for the design of new sound service studios which would be geared for fast and efficient service, bringing the highest quality possible to 16mm recording. The space for this operation would be made available from an existing unused shooting stage, so that the existing sound operation could continue while construction on the new studios and equipment rooms progressed.

After submitting blueprints of the available space to an architect and to Westrex Corp., a tentative layout plan for the studios was evolved. The basic idea was to have adequate space for the studios and work area, but not to spread it out and make efficient operation difficult. Figure 1 shows the final plan. This design incorporated an 18 × 32-ft re-

cording studio, two 12 × 18-ft narration-looping studios with associated control rooms, a raw stock storage and magazine-loading room, an 11 × 11-ft machine room, and a separate 6 × 11-ft transfer room, which could be closed off from the machine room by a sliding door. This separate transfer room was decided upon so that government classified recording

operations could be carried on without interrupting the rest of the studio operation.

A common projection booth is located on a second level with large double optical glass ports opening to each of the three studios. Access to the booth is by a stairway from the machine room. The layout is compact and efficient and there is adequate space for client observation of operations in the both control rooms and the re-recording theater.

In addition, space was allotted for a reception area, three cutting rooms and a small shop for the sound department.

Many problems had to be solved, one of which was the problem of vibration and noise transmission. With the laboratory located directly below the space

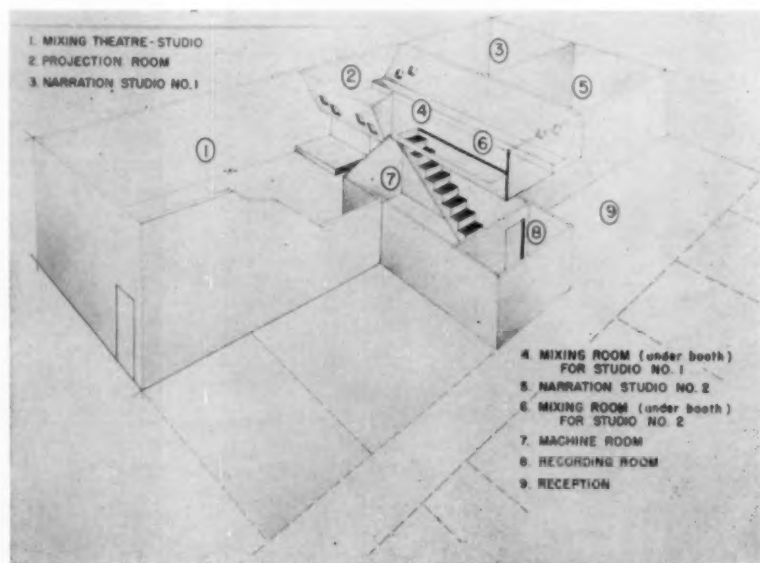


Fig. 1. Floor plan of studio.

Presented on April 22, 1958, at the Society's Convention in Los Angeles by Robert W. Eberenz, Byron, Inc., 1226 Wisconsin Ave., N.W., Washington 7, D.C.
(This paper was first received on March 3, 1958, and in final form on March 23, 1959.)

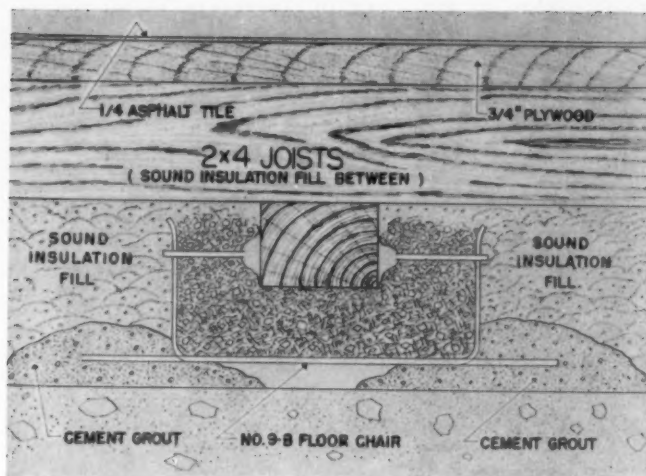


Fig. 2. Construction detail of floating studios.

allotted for the studios, it was found that there was considerable noise transmission through the floors of the building. An acoustical consultant was called in, and measurements were made of the noise transmission of various machines in the laboratory. The consulting engineer decided on "floating room" construction to minimize noise transmission from the laboratory equipment. All walls, floors and ceilings of the studios and machine rooms would have to be free from contact with the building frame. A cross section of the construction is shown in Fig. 2. All floors are set on Johns Manville 9B floor chairs which are set in concrete pyramids on the building frame. The wooden floor is built up from this floating platform. The floor's being raised over a foot from the building frame allowed the electrical power and audio ducts to be placed conveniently under the machines and under all consoles. These ducts were electric welded at all joints and bonded to ground. Where the ducts travel from room to room, an insulating material was inserted to prevent any sound transmission from one room to another.

All interior walls are isolated from the floors, and from the exterior building walls by Koroform Elasto Rib Pads. When the framework had been erected, all of the cavities were packed with sound insulation fill as a sound deterrent. Double interior walls of sheetrock were erected. All surfaces and joints were sealed and a 2 x 2-in. furring strip was built out from this wall in the form of 2-ft square cavities. Each of these 2-ft cavities was treated to give the overall acoustical effect desired in the individual studio. Thus, we were able to create "live" or "dead" walls or portions of walls by the material used. For the live sections we used Transite board set at a slight angle in the cavity. In the dead sections, 2-in. Johns Manville felt block was used. Over these walls and ceilings was erected

standard 24-in. square Johns Manville Transite acoustical sheets. The floors were covered with a felt blanket and then with rubber floor tile. The wall construction had to be entirely of wood. This was necessitated by floor weight loads and building-code restrictions which are rather strict in the Georgetown section of Washington.

Studio Equipment

So, with a well-designed and efficiently laid out studio facility, all that was needed was equipment equally well designed for efficient operation. Being a service studio, it is necessary to be able to handle any material supplied by clients — 35mm optical or magnetic, 16mm optical or magnetic, 17 1/2mm magnetic or 1/4-in. sync tape, and 35mm or 16mm picture material. This is a big order for any operation, but with the aid of Westrex Corp. we arrived at an equipment plan which would answer all our needs at present and provide for future expansion, and also supply other facilities such as looping and double-speed optical transfer.

First of all, let's look at the heart of a sound studio — the machine or dubbing room. Figure 3A shows the layout of the machine room with: the transmission and test rack in which all circuits commonly used are normalised; the master motor control, power supply and amplifier rack; the Westrex RA-1570-C 35mm optical and magnetic reproducer which operates at both 90 and 180 ft/min; the RA-1590-A 35mm optical and magnetic reproducer and magnetic recorder; the RA-1552-G 16mm magnetic reproducer and recorder, modified for looping; and the RA-1590-B 16mm optical and magnetic reproducer and magnetic recorder. One of the RA-1590 machines may also be operated as a 17 1/2mm recorder or reproducer by simple conversion. This one room provides three recording mediums,

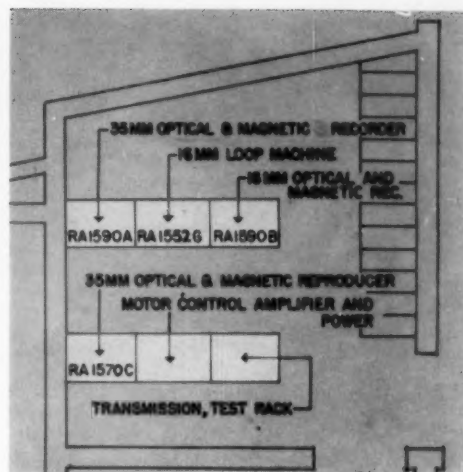


Fig. 3A. Equipment layout in machine room.

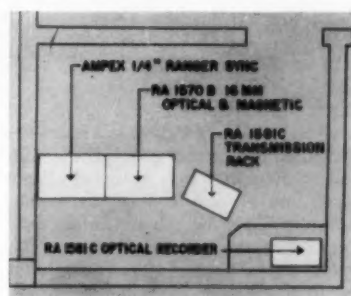


Fig. 3B. Equipment in transfer room.

one 35mm or 17 1/2mm and two 16mm. In addition there is in the adjoining transfer room (Fig. 3B) an additional RA-1570-B 16mm optical and magnetic reproducer also equipped for double-speed operation; a rack-mounted Ampex 1/4-in. tape unit with Rangertone sync attachment and associated supplies; and the RA-1581-C optical and magnetic film recorder and its associated transmission cabinet which will be discussed later. Thus it is possible to mix from five machines to the sixth or from six machines to 1/4-in. sync tape, which is adequate provision for present needs.

Re-recording Theater

Figure 4 depicts the re-recording theater which contains a custom-built Westrex eight-position console. This console (Figs. 5 and 6) is equipped with two sections of four slide attenuators and three graphic equalizers, two of which are instantly available at any mixing position by means of pushbuttons, the third being patchable in any position. The console patch bay is located on the right turret along with a transistor 400-cycle test oscillator. All circuits are available through this patch bay plus two variable high- and low-pass equalizers and telephone and radio effects filters and transfer switches. Immediately in front of the

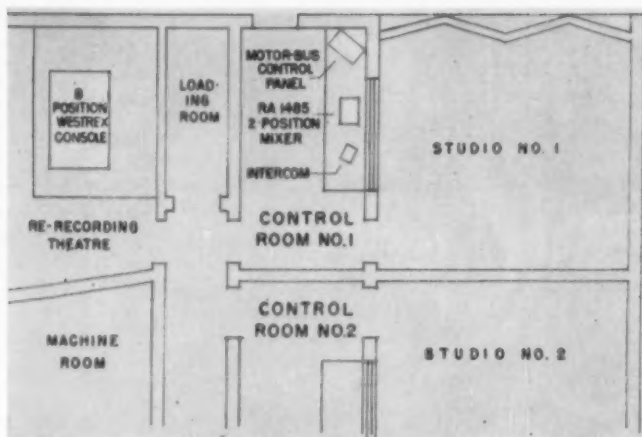


Fig. 4. Equipment arrangement for re-recording theater and narration studios.

mixer is the volume indicator meter with attenuator, the compression meter and a 16mm and 35mm selsyn-driven, film-footage counter. Since the original installation, we have built a projection volume indicator and footage counter which appear under the projection screen.

The lefthand turret contains the controls of the motor bus, an interlock-run switch and a machine-reversing switch; indicator lights for the individual machines that are interlocked on the bus and a record and playback switch for the loop recorder. We have recently added remote controls for the $\frac{1}{4}$ -in. sync tape machine to this turret, allowing us to make protection tapes on all mixes and enabling us to play back immediately in sync with picture from the $\frac{1}{4}$ -in. tape.

The console is light green and is lit from recessed lights overhead which are dimmed from the console. Studio lighting is also controlled through dimmers at the console.

To get away from the stereotyped theater atmosphere, colorful and comfortable deck chairs are provided for the viewing audience. The studio will seat 45 persons comfortably.

Projection facilities for this studio are provided by a Bell & Howell 16mm projector modified with a Westrex RA-1510-A motor for forward and reverse interlock operations. A portable Simplex 35mm projector, similarly equipped, completes the projection facilities for this room.

An Altec "Voice of the Theater" A 7 speaker system is normally used for monitoring, but a standard 12-in. Bell & Howell projector speaker, and a 5-in. TV-type speaker can be keyed in from the console for purposes of comparison if desired by the client.

Narration and Looping

For the two narration studios, Westrex Corp. modified two RA-1524 two-position mixers to enable selecting either microphone inputs or mixer inputs. This allows doing straight narration or a simple two-track mix. Slating, talk-back and automatic playback are provided on both of these consoles. A motor control panel similar to that on the re-recording console is found in each of these rooms, making remote control of the motor buses possible. In the case of the loop recorder, playback and

record switching are possible from the control room. The looping system installed is similar to that used at the Army Pictorial Center. As previous papers have adequately covered this system, it will not be discussed here.*

It will be noted that the RA-1552-G is used extensively in narration recording. When mistakes are made, one simply runs back past the objectional line and makes the pickup, erasing the previous bad take. This is of great help when adding narration to a previously cut picture. Time is saved, and therefore money, for the producer. Both these studios are served with Bell & Howell modified projectors. These projectors have also been modified so that they may be used as optical dubbers to be interlocked when needed in re-recording. Monitoring is available in both the control room and the studio, and straight composite print screening is also possible. One of the studios is equipped with a nonsync turntable to use in transfer of disk sound effects or music to 16mm magnetic for subsequent cutting.

Transfer

The optical transfer system is the most modern in the 16mm industry (Fig. 7), being the first use of the new Westrex RA-1581-C optical film recorder, a recorder which incorporates the latest in electronic design in optical film recording. The recorder has a single drive sprocket with the film coming from the magazine either on the left or right, proceeding under an idler roller and over an impedance drum. The film proceeds under the filter roller, back to the other side of the drive sprocket, and back into the magazine. A loop light indicates proper threading. Also, an adjustment is available to balance the filter arm flanges.

* George Lewin, "Special techniques in magnetic recording for motion-picture production," *Jour. SMPTE*, 56: 653-663, June 1951; see also: George Lewin, "Magnetically striped loops for lip-synchronizing production," *ibid.* 62: 409-418, June 1954.



Fig. 5. Westrex re-recording console (right angle).

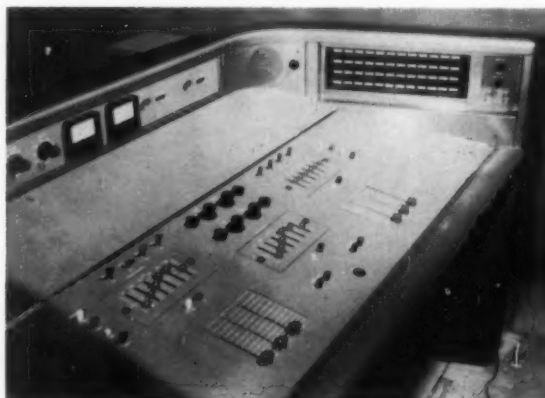


Fig. 6. Westrex re-recording console (left angle).

The modulator is located to the left of the film chamber. This modulator incorporates a visual monitor rotating prism allowing the operator to see the visual modulation during recording and noise reduction closure and 100% modulation during setup of the light valve for recording. A dual bilateral light valve is used for negative recording, a bilateral for positive recording.

An exposure meter is also incorporated in this modulator, taking comparative readings from the recording lamp or a built-in standard. Thus a high accuracy of exposure control is possible. A fully transistorized PEC monitor amplifier is provided in the recorder housing having nominal output impedances. Notable is the addition of magnetic record and reproduce heads to this recorder, making it useful as an additional magnetic recorder. In our operation most multitrack mixes are done with this machine due to the availability of compression in this channel.

The transmission rack for the RA-1581-C is located adjacent to the recorder. This rack houses all additional amplifiers, filters, equalizers and controls. All operating controls are easily accessible. All individual units are easily removed for service or replacement. This noise-reduction amplifier is located at the upper left, next to it is the lamp current meter and potentiometer. The VI meter and meter multiplier and the compression meter and controls complete the top row of recorder controls. On the second row we find the exposure meter, talk-back slate and monitor control panel. A test oscillator which supplies 400-c and a 20,000-c adjustable tone pulse for balancing the compressor tubes for minimum thump, the film-loss equalizers and the double-speed equalizer complete this section. Just below this section are found the magnetic record switch, magnetic bias adjustment and the record amplifier input and output controls. The

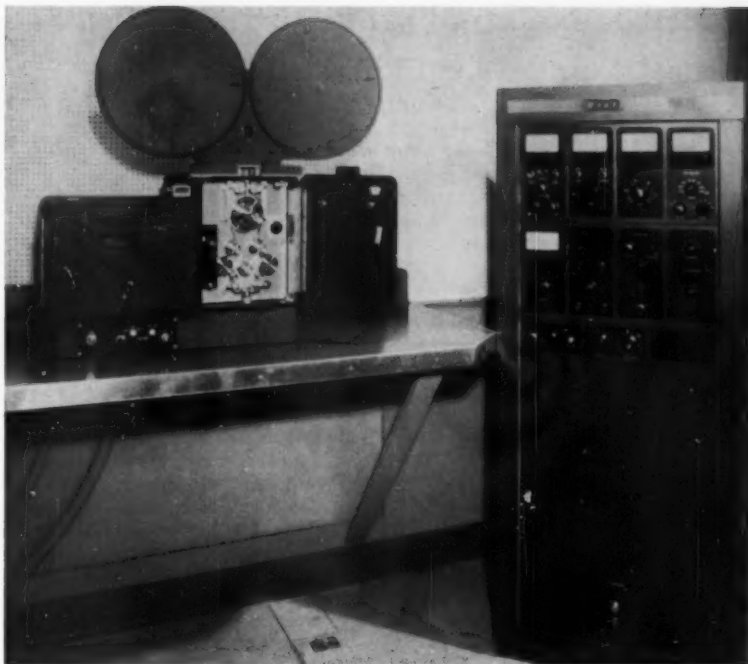


Fig. 7. Westrex RA-1581-C Optical Film Recorder and RA-1581-C Transmission Rack.

record amplifier, high- and low-pass filters and light valve attenuator are easily accessible through a hinged panel at the front. The transmission rack is completed by the recording lamp supply.

The facility of this recorder which helps greatly in high-speed transfer work is its ability to operate at double speed. A normal transfer is set up then by the simple operation of depressing a button located in the recorder handwheel and setting the film equalizer to 2X. We are then ready to transfer material from either 16mm or 35mm machines that are similarly equipped to operate double speed. No loss in quality has been observed in this type of operation.

Conversion of the recorder to magnetic operation is done simply by replacing the magazine holder and setting the optical magnetic switch to magnetic. Bias current is then read on the noise-reduction meter. Compression may be used in magnetic recording with this recorder.

Space does not permit covering all of the labor- and time-saving circuits and safety devices employed. This paper serves only to show, in brief, the planning, construction and equipping of a modern 16mm sound service studio, a studio which was conceived to bring fast, efficient and top-quality sound to the independent 16mm producer.

A Method of Recording, Editing and Mixing Magnetic Sound for Industrial Films

By DONALD A. ANDERSON,
ROBERT H. WINTER
and REID H. RAY

Methods of recording, editing and mixing live dialogue, sound effects and music in industrial film productions vary greatly. One method is outlined and the conversion from optical sound recording to magnetic sound, with a minimum of new equipment is described. Parallel techniques are followed using 35mm soundtracks for both 16mm and 35mm photography.

THE ORIGINAL SOUND is recorded on full-coat magnetic film (Fig. 1), and both sides of the film are used. This allows double the recording time per roll and half the storage space.

The recorded full-coat magnetic film is threaded on a film phonograph (dubber) and a transfer made to single-stripe magnetic film. During this transfer operation, only the approved original recorded materials are transferred. At this point, too, recording level may be further controlled and compensation made to assure best sound quality. After this single-stripe magnetic film is recorded, the track is ready for editing.

After editing, the transferred original sound now reaches the mixing or re-recording stage. Here dialogue or narration, music tracks and/or several sound-effects tracks are re-recorded, resulting in a composite of all these sounds on full-coat magnetic film. This is the "master track" and from this, optical sound negatives for either 35mm or 16mm release prints are recorded (Fig. 2). Briefly, these are the major steps involved in this method of magnetic film recording.

Steps Described in Detail

The original recording sometimes includes live dialogue with the sound recorded on separate film.

In some situations, more than one camera may be used. Again, the sound is recorded separately from the camera film.

Presented on October 24, 1958, at the Society's Convention in Detroit by Donald A. Anderson (who read the paper), Robert H. Winter and Reid H. Ray, Reid H. Ray Film Industries, Inc., 2269 Ford Pkwy., St. Paul 16, Minn. (This paper was received on March 17, 1959.)

Much of the sound for industrial films is "narration." This is recorded in a studio and this method is usually called "wild" or "offstage" recording.

The transfer phase starts with the original full-coat magnetic being threaded in a synchronously driven film-phonograph.

These machines, original optical reproducers, have been converted to use either optical or magnetic film by the installation of magnetic film playback heads and preamplifiers.

From the originally magnetic film, a copy or transfer of the acceptable portions of the recording are made on single-stripe magnetic film. Many variations of the frequency characteristic of the recorded material are possible at this time. A decision can also be made as to whether or not volume compression is desirable.

This, then, is the ideal time to compensate for any deficiencies that may be present in the original recording. Special effects, such as telephone voices or echo effects requiring added reverberation, may be made at this time.

To assure faithful reproduction of the original sound, the magnetic coating on the film must be in contact with the recording or playback heads (Fig. 3). Wiping with a soft cloth, such as velvet, helps keep the film as free as possible from foreign particles such as dust and splicing chips.

After transfer, the film is delivered to the Editorial Department. To facilitate the playing or cuing of the track, the rear sprocket of the gang on all film synchronizers has been adapted to accommodate a magnetic playback head (Fig. 4).

Since our synchronizers were pur-

chased at various times, a slight problem was encountered in that no two machines were the same styling. Each magnetic playback head adapter was "tailor-made" so to speak, for each synchronizer.

When a particular sequence of film is to be animation, a precise frame count reading is necessary as an aid to the animator in charting. Playing the track and counting the frames is done in one operation. Many times, key words are written on the film with a wax pencil to aid in cutting. In this operation care must be exercised to keep the wax away from the magnetized oxide on the track area.

The synchronizers are conventionally used with work print and magnetic-striped track. A two-wire lead from the playback head is connected to an auxiliary amplifier and speaker, or it may be plugged into the amplifier of a sound Moviola.

The soundhead attachments on the Moviolas have been adapted to play magnetic as well as optical tracks. These magnetic adaption kits are relatively simple to install. The magnetic pickup is positioned on the opposite side of the film gate (Fig. 5) from the location of the optical pickup. A different film gate and film slide must be installed. When not in use, or when reproducing an optical track, the pickup is raised by means of a knurled adjustment screw to prevent unnecessary wear on the head.

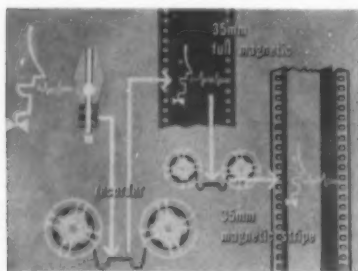


Figure 1

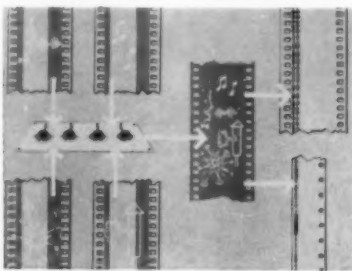


Figure 2

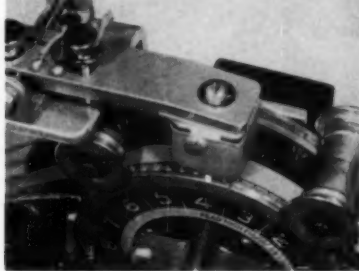


Figure 3

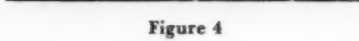


Figure 4

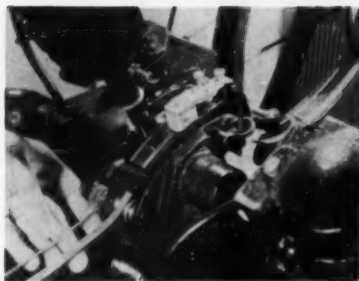


Figure 5

A 16mm picture and 35mm sound-track synchronizer (Fig. 6) is similarly set up. A Bell & Howell splicer is used to splice the edited magnetic track. One of several advantages of magnetic film is the complete absence of "bloops," those annoying pops that must be painted, air-brushed, or taped in an optical track. One word of caution: when using this type of overlap splice, the splice must be oriented so that the playback head will fall off the trailing edge of the overlapped splice, rather than strike it. This abrupt contact may cause the playback head momentarily to lose contact with the film surface and produce a dropout of sound level.

If there has been a close cut between words or sounds, or when the spliced film is re-used for recording, a type of butt splice is desirable. Dropouts are minimized with this type of splice. Whenever using spliced stock for recording, it is advisable to check for dropouts.

Re-recording

The next step is re-recording. The picture work print and the magnetic-stripe track are run as "double system" or "interlock" on a projector with preview attachment (Fig. 7). The audio output from this track, and the music and sound-effects tracks threaded on film phonographs, are patched through to the mixing console.

Once the selsyn system driving all the motors is turned on, the projector and film phonographs start together and stay in, electrically interlocked.

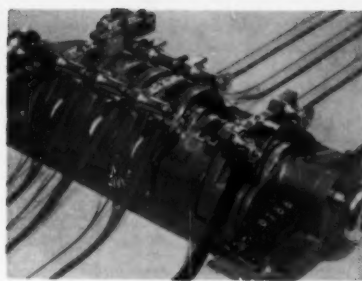


Figure 6

Many productions are photographed on 16mm film, so provision is made for the interlock screening of 16mm prints with the 35mm magnetic soundtracks.

Interlock is obtained by a selsyn "slave" motor driving the 16mm projector with the use of a rubber sprocket drive belt (Fig. 8).

After rehearsals, the recorder, projector and film phonographs are started as before with 35mm picture, and a composite recording is made. At this point, it may be interesting to mention that the immediate playback of this recording allows approval of the "mix."

The final step is the transfer to either a 35mm or 16mm optical negative for release printing. 16mm optical negatives are made in either A wind or B wind and a recorder that will run forward and reverse is necessary for these requirements. The type of 16mm optical sound negative required depends on whether the original camera film will be printed by reduction, contact, or if the photography has been color or black-and-white.

After a production has been completed with optical negatives and release prints made, use is made of those sections of magnetic-stripe film which are too short to be used for recording purposes. A large roll is spliced together and the balancing striped edge is dyed green to identify the roll as usable for "fill-in" leader, but undesirable for recording use. The colored edge on the leader immediately identifies it.

No estimate has been made as to the life expectancy of magnetic recordings,

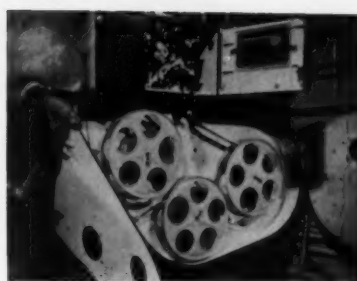


Figure 7

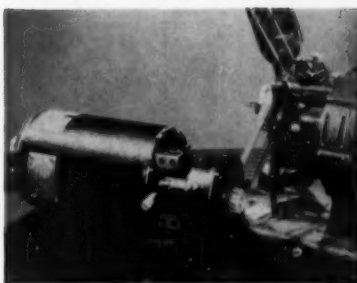


Figure 8

but recordings made five years ago appear to have retained their original quality. Perhaps of even greater importance than the economy of magnetic recording is the re-use of the material many times after erasure or degaussing. The time saved in immediate delivery of sound to the Editorial Department, without the time consumed in the laboratory developing optical tracks, is apparent.

Conclusion

The four steps in magnetic recording using modified optical editing and re-recording equipment are: (1) the original recording on to a full-coat magnetic film; (2) the transfer from this original to a magnetic-stripe track for editing; (3) the re-recording phase where narration, music, and sound effects are mixed and recorded on full-coat magnetic film; and (4) the transfer of the full-coat magnetic recording to an optical negative.

Recommended Practice for Reporting Photometric Performance of Incandescent Filament Lighting Units Used in Theatre and Television Production

Prepared by the Joint IES-SMPTE Committee on Equipment Performance Ratings

The SMPTE Board of Governors approved this Recommended Practice at its February 13, 1959, meeting. There have been no changes since the trial publication in the September 1958 *Journal*. However, Appendix A, Technical Information on Lamps Used for Testing and Reporting Data, was omitted from the version in the September issue since it was incomplete; it is published here so as to complete the Recommended Practice. Reprints will be available shortly from Society headquarters.

APPENDIX A — TECHNICAL INFORMATION ON LAMPS USED FOR TESTING AND REPORTING DATA.
 Reproduced from the *IES Lighting Handbook*, Third Edition.

Ordering Designation	ASA Code	Base	Bulb	Watts	Filament	Light Center Length (inches)	Max. Over-all Length (inches)	Life (hours)	Approx. Initial Lumens	Approx. Mean Color Temperature (degrees K)
Lamps for Fresnel Lens and Plano-Convex Lens Spotlights and Parabolic Reflector Floodlights										
75G16 1/2/SC DC		Bay. Cand.	G-16 1/2	75	C-5	1 1/8	3	200	795	2700
100G16 1/2/29 SC or DC		Bay. Cand.	G-16 1/2	100	CC-13	1 1/8	3	200	1600	2800
150G16 1/2/SC DC		Bay. Cand.	G-16 1/2	150	2CC-8	1 1/8	3	200	2500	2800
100A21/8P		Med. Sc.	A-21	100	C-5	3	4 7/16	200	1350	2700
100A21/FL		Med. Sc.	A-21	100	C-5	3	4 7/16	800	1120	—
150P25/10		Med. Sc.	P-25	150	C-5	3	4 1/4	200	2100	2700
250A23		Med. Sc.	A-23 IF	250	C-9	4 1/4	6 1/16	20	6600	3200
250P25/FL		Med. Sc.	P-25	250	C-5	3	4 1/4	800	3750	—
250G/FL		Med. Sc.	G-30	250	C-5	3	5 1/4	800	3750	—
250P25/5		Med. Sc.	P-25	250	C-5	3	4 1/4	200	4700	2800
250P25/SP		Med. Sc.	P-25	250	C-5	3	4 1/4	200	4700	2800
400G/SP		Med. Sc.	G-30	400	C-5	3	5 1/4	200	8000	2900
400G/FL		Med. Sc.	G-30	400	C-5	3	5 1/4	800	6700	—
500P825/5		Med. Sc.	P8-25 IF	500	C-9	5 1/4	6 11/16	60	13000	3200
250P25/P8P		Med. Pref.	P-25	250	C-5	2 3/16	5	200	4700	2800
250G/P8P		Med. Pref.	G-30	250	C-5	2 3/16	5 1/4	200	4350	2800
500T20/48		Med. Pref.	T-20	500	C-13	2 3/16	5 1/4	300	11000	3000
500T20/57		Med. Pref.	T-20 Clr	500	C-13	2 3/16	5 1/4	30	13400	3200
500T20/64		Med. Pref.	T-20	500	C-13	2 3/16	5 1/4	500	9500	2900
750T20F/8P		Med. Pref.	T-20	750	C-13	2 3/16	5 1/4	200	17000	3000
500T20/60		Med. Bipin	T-20	500	C-13	2 1/2	6 1/2	8	16000	3350
500T20/63		Med. Bipin	T-20	500	C-13	2 1/2	6 1/2	35	13500	3200
500T20/70		Med. Bipin	T-20	500	C-13	2 1/2	6 1/2	200	11000	3000
750T24/13		Med. Bipin	T-24	750	C-13	2 1/2	6 1/2	12	24000	3350
750T24/16		Med. Bipin	T-24	750	C-13	2 1/2	6 1/2	50	20500	3200
750T24/5		Med. Bipin	T-24	750	C-13	2 1/2	6 1/2	200	17200	3000
500G/FL		Mog. Sc.	G-40	500	C-5	4 1/4	7 1/16	800	8800	—
500G/SP		Mog. Sc.	G-40	500	C-5	4 1/4	7 1/16	200	10100	—
1M/G40/FL		Mog. Sc.	G-40	1000	C-5	5 1/4	8	800	19000	—
1M/G40SP4 1/4		Mog. Sc.	G-40	1000	C-5	4 1/4	7 1/16	200	22500	—
1M/G40/24		Mog. Sc.	G-40	1000	C-13	5 1/4	8	35-50	28000	3200
1M/G40SP5 1/4		Mog. Sc.	G-40	1000	C-5	5 1/4	8	200	22500	3000
1500G48/6		Mog. Sc.	G-48	1500	C-5	5 1/4	8 1/4	800	30500	—
2M/G48/3		Mog. Sc.	G-48	2000	C-5	5 1/4	8 1/4	200	47000	3050
2M/G48/3		Mog. Sc.	G-48	2000	C-13	5 1/4	8 1/4	200	52000	3050
1M/G40/25		Mog. Pref.	G-40	1000	C-13	3 13/16	8 7/16	35-50	28000	3200
1M/G40/23		Mog. Pref.	G-40	1000	C-13	3 13/16	8 7/16	200	23000	3000
1M/G40/P8P		Mog. Pref.	G-40	1000	C-5	3 13/16	8 7/16	200	22500	3000
1500G40/15		Mog. Pref.	G-40	1500	C-5	3 13/16	8 7/16	200	36000	3050
2M/G48/21		Mog. Pref.	G-48	2000	C-13	3 13/16	9	60	54500	3200
2M/G48/5		Mog. Pref.	G-48	2000	C-13	3 13/16	9	200	52000	3050
2M/G48/4		Mog. Pref.	G-48	2000	C-5	3 13/16	9	200	47000	3050
1M/G48/8		Mog. Bipin	G-48	1000	C-13	5	9 1/4	100	25500	3100
1M/G48/11		Mog. Bipin	G-48	1000	C-13	5	9 1/4	200	23000	3000
2M/G48/8		Mog. Bipin	G-48	2000	C-13	5	9 1/4	100	58000	—
2M/G48/9		Mog. Bipin	G-48	2000	C-13	5	9 1/4	60	57000	3200
2M/G48/14		Mog. Bipin	G-48	2000	C-13	5	9 1/4	25	64000	3350
2M/G48/18		Mog. Bipin	G-48	2000	C-13	5	9 1/4	100	58000	3200
2M/G48/19		Mog. Bipin	G-48	2000	C-13	5	9 1/4	60	54500	3200
2M/G48/17		Mog. Bipin	G-48	2000	C-13	5	9 1/4	200	51500	3100
2M/G48/31		Mog. Bipin	G-48	2000	C-13	5	9 1/4	25	64800	3350
2M/T30/2		Mog. Bipin	T-30	2000	C-13	5	10	200	53000	—
2M/T48/1		Mog. Bipin	T-48	2000	C-13	5	10 1/2	100	57500	3200
2M/T48/4		Mog. Bipin	T-48	2000	C-13	5	10 1/2	25	64000	3350
5M/G64/3		Mog. Bipin	G-64	5000	C-13	6 1/2	11 1/4	75	165000	3350
5M/G64/7		Mog. Bipin	G-64	5000	C-13	6 1/2	11 1/4	150	141000	3200
5M/T64/1		Mog. Bipin	T-64	5000	C-13	6 1/2	13 1/4	75	165000	3350
5M/T64/3		Mog. Bipin	T-64	5000	C-13	6 1/2	13 1/4	150	141000	3200
10M/G96/2		Mog. Bipin	G-96	10000	C-13	10	17 1/4	75	330000	3350
10M/G96		Mog. Bipin	G-96	10000	C-13	10	17 1/4	75	330000	3350

Lamps for Ellipsoidal-Reflector Spotlights

250T12/7	Med. Pref.	T-12	250	C-13	3 1/2	5 1/4	200	4600	2900
250T12/8	Med. Pref.	T-12	250	C-13	3 1/2	6 1/4	800	3750	2750
500T12/9	Med. Pref.	T-12	500	C-13D	3 1/2	5 1/4	200	10200	2950
500T12/8	Med. Pref.	T-12	500	C-13D	3 1/2	5 1/4	800	8700	2800
750T12/9	Med. Pref.	T-12	750	C-13D	3 1/2	6 1/4	200	16599	3000
250T14/9	Med. Bipin	T-14	250	C-13	4	6 1/4	800	3750	2750
500T14/8	Med. Bipin	T-14	500	C-13D	4	6 1/4	200	10200	2950
500T14/7	Med. Bipin	T-14	500	C-13	4	6 1/4	800	9000	2850
750T14	Med. Bipin	T-14	750	C-13D	4	6 1/4	200	16500	3000
1M/T24/12	Med. Bipin	T-24	1000	C-13	5 1/2	9 1/4	1000	19600	—
1M/T24/5	Mog. Bipin	T-24	1000	C-13D	6 1/2	10	200	21500	3000
1500T24/6	Mog. Bipin	T-24	1500	C-13D	6 1/2	10	200	33500	3000
2M/T30/1	Mog. Bipin	T-30	2000	C-13D	6 1/2	10	200	48000	3050
3M/T32/2	Mog. Bipin	T-32	3000	C-13D	7 1/2	11 1/2	100	81000	3150
5M/T32/1	Mog. Bipin	T-32	3000	C-13D	8 1/2	12 1/2	100	150000	3200

Lamps for Use in Special Equipments

2100/T24/8	Mog. Bipin	T-24	2100	C-13D	4	10 1/2	50	54000	3150
4M/T32	Mog. Bipin	T-32	4000	C-13D	4	14	50	114000	3200
7M/T32	Mog. Bipin	T-32	7000	C-13D	6 1/2	21	75	230000	3300

Ordering Designation	ASA Code	Base	Bulb	Watts	Filament	Light Center Length (inches)	Max. Over-all Length (inches)	Life (hours)	Approx. Initial Lumens	Approx. Mean Color Temperature (degrees K)
Lamps for Floodlights, Scoops and Striplights										
25A, 25A/CL		Med. Sc.	A-19	25	C-9	2 1/2	3 13/16	1000	265	—
40A, 40A/CL		Med. Sc.	A-19	40	C-9	2 1/2	4 1/4	1000	465	—
50A, 50A/CL		Med. Sc.	A-19	50	CC-6	3 1/2	4 7/16	1000	660	—
60A, 60A/CL		Med. Sc.	A-19	60	CC-6	3 1/2	4 7/16	1000	885	—
75A, 75A/CL		Med. Sc.	A-19	75	CC-6	3 1/2	4 7/16	750	1150	—
100A, 100A/CL		Med. Sc.	A-21	100	CC-6	3 1/2	5 1/16	750	1630	—
150A, 150A/CL		Med. Sc.	A-23	150	CC-6	4 1/4	6 5/16	750	2700	—
150, 150/CL		Med. Sc.	PS-25	150	C-9	5 1/4	6 13/16	750	2600	—
200A, 200A/CL		Med. Sc.	A-25	200	CC-6	5 1/4	6 13/16	750	3700	—
200, 200/IF		Med. Sc.	PS-30	200	C-9	6	8 1/16	750	3700	—
300M, 300M/IF		Med. Sc.	PS-30	300	C-9	6	8 1/16	750	5900	—
300, 300/IF		Mog. Sc.	PS-35	300	C-9	7	9 1/8	1000	5650	—
500, 500/IF		Mog. Sc.	PS-40	500	C-9	7	13 1/16	1000	9900	—
750, 750/IF		Mog. Sc.	PS-52	750	C-7A	9 1/2	13 1/16	1000	15600	—
750, 750/IF		Mog. Sc.	PS-52	750	CC-8	9 1/2	13 1/16	1000	16700	—
1000, 1000/IF		Mog. Sc.	PS-52	1000	C-7A	9 1/2	13 1/16	1000	21500	—
1000, 1000/IF		Mog. Sc.	PS-52	1000	CC-8 or 2CC-8	9 1/2	13 1/16	1000	23000	—
1500, 1500/IF		Mog. Sc.	PS-52	1500	C-7A	9 1/2	13 1/16	1000	33000	—
750/W	EAF	Mog. Sc.	PS-52*	750	C-7A	9 1/2	13 1/16	1000	15000	2750
1000/W	EAG	Mog. Sc.	PS-52*	1000	C-7A	9 1/2	13 1/16	1000	19000	2800
1500/W	DKL	Mog. Sc.	PS-52*	1500	C-7A	9 1/2	13 1/16	1000	27500	2850
1M/PS52/77	ECY	Mog. Sc.	PS-52	1000	C-7A	9 1/2	13 1/16	75	25500	3200
1500/PS52/78	ECY	Mog. Sc.	PS-52	1500	C-7A	9 1/2	13 1/16	100	40000	3200
2M/PS52/76	ECZ	Mog. Sc.	PS-52	2000	C-7A	9 1/2	13 1/16	15	65000	3350
750T24		Med. Bipin	T-24**	750	C-13	9 1/2	5 1/2	1000	14200	—
1M/T24		Med. Bipin	T-24**	1000	C-13	9 1/2	5 1/2	1000	20000	—

Watts	Bulb	Description	Base	Max. Over-all Length (inches)	Approx. Beam Spread (degrees) ^b	Approx. Beam Lumens	Approx. Total Lumens	Approx. Average Candlepower in Central 10-degree Cone
Reflector Lamps ^c								
30	R-20	Flood	Med.	3 13/16	85	140	200	290
75	R-30	Spot	Med.	5 1/2	50	400	710	1800
75	R-30	Flood	Med.	5 1/2	130	610	710	430
150	R-40	Spot	Med.	6 1/2	40	810	1765	6000
150	R-40	Flood	Med.	6 1/2	110	1500	1765	1250
300	R-40	Spot	Med.	6 1/2	35	1800	3550	13500
300	R-40	Flood	Med.	6 1/2	115	2800	3550	2500
300	R-40*	Spot	Med.	6 1/2	35	1600	3550	12500
300	R-40*	Flood	Med.	6 1/2	115	2700	3550	2550
300	R-40*	Spot	Mog.	7 1/4	35	1600	3550	12500
300	R-40*	Flood	Mog.	7 1/4	115	2700	3550	2550
500	R-40*	Spot	Mog.	7 1/4	35	3100	6100	22000
500	R-40*	Flood	Mog.	7 1/4	115	5400	6100	5200
500	R-52	Wide Beam	Mog.	11 3/4	110	—	7550	—
750	R-52	Wide Beam	Mog.	11 3/4	110	—	12700	—
1000	R-52*	Wide Beam	Mog.	11 3/4	110	—	16300	—
1000	RB-52	Wide Beam	Mog.	12 3/4	130	—	16300	—
550	R-52	Wide Beam	Mog.	11 3/4	120	—	8100	—
800	R-52	Wide Beam	Mog.	11 3/4	120	—	13500	—
550	R-57	Narrow Beam	Mog.	12	70	—	8100	—
800	R-57	Narrow Beam	Mog.	12	70	—	13500	—
1000	R-57	Narrow Beam	Mog.	12	70	—	16300	—

Projector Lamps ^d								
75	PAR-38	Spot	Med. Skt.	5 5/16	30 x 30	465	730	4800*
75	PAR-38	Flood	Med. Skt.	5 5/16	60 x 60	570	730	1350*
150	PAR-38	Spot	Med. Skt.	5 5/16	30 x 30	1100	1730	10500*
150	PAR-38	Flood	Med. Skt.	5 5/16	60 x 60	1350	1730	3400*
150	PAR-38	Spot	Med. Side Prong	4 9/16	30 x 30	1100	1730	10500*
150	PAR-38	Flood	Med. Side Prong	4 9/16	60 x 60	1350	1730	3400*
200	PAR-46	Narrow Spot	Med. Side Prong	4	17 x 23	1200	2350	30000*
200	PAR-46	Med. Flood	Med. Side Prong	4	20 x 40	1300	2350	11000*
300	PAR-56	Narrow Spot	Mog. End Prong	5	15 x 20	1800	3650	70000*
300	PAR-56	Med. Flood	Mog. End Prong	5	20 x 35	2000	3650	22000*
300	PAR-56	Wide Flood	Mog. End Prong	5	30 x 60	2100	3650	10000*
500	PAR-64	Narrow Spot	Extended	6	13 x 20	3000	6000 ^f	110000*
500	PAR-64	Med. Flood	Mog. End	6	20 x 35	3400	6000 ^f	35000*
500	PAR-64	Wide Flood	Prong	6	35 x 65	3500	6000 ^f	12000*

*Inside Diffuse White Coating.

**Inside Frosted.

*Heat-resistant glass bulb.

^bTo 10 per cent of maximum candlepower.

^cThe rated average life of reflector (R) lamps is 2000 hours.

^dThe rated average life of projector (PAR) lamps is 2000 hours. All PAR lamps have bulbs of molded heat-resistant glass.

^eCentral cone defined as 5-degree cone for all spots and 10 degree cone for all floods.

^fTentative value.

news and



reports

86th Convention Papers Program

Under the general theme of "Motion Pictures and Television in the Space Age," and under Program Chairman J. Paul Weiss, the expected roster of ten Topic Chairmen is nearly complete. The chosen topic areas and the chairmen for each will be published in the next issue of the *Journal*.

In the meantime, Author Forms are available from Society Headquarters and from: J. Paul Weiss, 86th SMPTE Program Chairman, Du Pont Photo Products Dept., Parlin, N.J.

Dear Mr. Plakun:

Since Mr. Glenn E. Matthews has confirmed my appointment as National Regional Chairman of the Papers Committee for Argentina, I feel it to be my duty to present myself to you, and through your kindness, to all the members of the Papers Committee.

I think it has been an excellent move of the SMPTE to extend its activities on an international scale. Working conditions vary according to the general character of each country; and as a consequence each country may have its own idiosyncrasies. It may be necessary to do the same things in other ways in different surroundings, and still may be possible to arrive at the same results. As this new program gets really

under way, the exchange of knowledge which will result from it should be extraordinarily fruitful.

It was very pleasant for me to read in the minutes of the meeting of the Papers Committee of Tuesday, October 21, 1958, the particular interest this committee is taking in its relations with Latin America. I have always felt that the people of this — our American Continent — have more in common than is realized generally. All of the peoples of this continent have been faced with pioneering problems: first in settling the land, and then in creating everything from nothing. The genuine creativeness which resulted from this, is, I feel, the common American inheritance.

It is the engineer's, as well as the tech-

Bearing upon the growing success of the Papers Committee in carrying out the policies of the Society, we publish below a letter from Sr. Pablo Tabernero, Laboratories Alex S.A., Buenos Aires, written in acknowledgment of his reappointment as National Regional Papers Chairman for Argentina. It seems of special interest as an encouragement toward increased activities beyond the Society's habitual boundaries. It is published through the courtesy of General Papers Chairman Ben Plakun and with the permission of Sr. Tabernero.

nician's, the artist's, the scientist's, privilege to create things; and on this common ground, I am sure, Americans of the North and Americans of the South will understand each other very easily. I like to think of the, as yet distant, day when the membership of the SMPTE in Latin America will be large enough to warrant a Spanish edition of the *Journal* or, at least, a Spanish edition of the most outstanding papers published by it.

As for myself, I am trying to do my best to help in extending knowledge of the SMPTE. With my respectful greetings to you and to all the members of the Papers Committee I remain,

Yours very truly,
PABLO TABERNERO

Education, Industry News

A delightful "Texas story" has come to the *Journal's* Editorial office in the form of a release from the McLendon Corp., motion-picture producers of 2008 Jackson St., Dallas, Tex. Difference between this and other tall stories is that this one's true.

"Texas," the release starts out, "has wheeled around in its well-worn tracks and taken direct aim on the California celluloid capital." Since the release conforms to Texas tradition in length as well as hyperbole, it appears below in condensed form.

"Already, two full-length motion pictures have been churned out by the nation's newest producing company with headquarters and shooting studios located on the shores of Lake Dallas. Setting sights behind the venture are two of the Southwest's elder business men and long-time showmen, B. R. and Gordon B. McLendon. This Texas father and son combination... plunked down an initial \$500,000 for a 500-acre tract of land formerly occupied by a financially ailing film production company. To insure top-flight facilities, the pair immediately anteed up another \$250,000 for scheduled improvements, a giant new sound stage and renovation of a 14,000-sq ft lodge to house cast and crew during filming.

"All this was not done without exhaustive research and depth probings of other film renegades who have flopped in their fight for a beachhead in motion-picture producing outside of Hollywood.

"The first release, *The Killer Shrews*, stars Ingrid Goude and James Best. Miss Goude... as Miss Sweden, made her buxom bow as runnerup in the 'Miss Universe' in 1957... The second feature, *The Gila Monster*, spotlighted newcomer Don Sullivan and international beauty, Lisa Simone, the former 'Miss France'...

"In both pictures, 27 hand-picked Hollywood technicians and crewmen have been flown into the Lone Star State to get the new firm off on solid production footage, among them Ray Kellogg, a 30-year veteran of directing and special effect wizardry at 20th Century-Fox, to serve as Director. Rounding out the staff heads were Chief Cinematographer Wilfred Kline, Chief Camera Operator George Nogel, Lighting Specialist George Satterfield and Film Editor Aaron Stell, all of Hollywood. To beef up front office operations... appointments of James H. Foster as Financial Vice-President and Mitchell I. Lewis as Advertising and Publicity Chief were announced.

"In all, the McLendons are presently up to their elbows and in the motion-picture business to stay. With Dallas daring, dynamics and dollars the insatiable appe-

tites of aggressive theater owners and hungry movie consumers can eagerly look forward to a tasty new fare — Texas style!"

Omission and Error

The footnote to "A Flying Spot Film Scanner for Color Television," by H. E. Holman, G. C. Newton and S. F. Quinn, abridged for the *Journal* (March 1959, pp. 137-140) failed to credit Electrical & Musical Industries Ltd., Research Laboratories, Blyth Road, Hayes, Middlesex, England, where the paper was prepared for its original publication in the *Proc. of Electrical Eng.*, from whom permission was obtained for the publication of the Abridgment in the *Journal*. (Since the paper first appeared, one of the authors, Mr. Quinn, has joined Canadian Broadcasting Corp., Engineering Div., Montreal, Que., Canada.) The *Editor* sincerely regrets this oversight, which was called to our attention by Mr. Newton.

An item in the Education, Industry News section of the March 1959 *Journal* (p. 176), "The Committee on International Nontheatrical Events (CINE)..." incorrectly lists Riviera Productions, Los Angeles, as producers of the film *Silk*. The film was produced by Wheaton Galentine, New York.



Don't ask us to help you with the love interest.

If your script needs tinkering, go to a script

doctor! Feel free, however, to come to CECO*

with any technical problem. Chances are we have

in stock the equipment to do what you want

done. If not, we'll alter or combine—even

custom-build it for you. Don't bet there's any

mechanical problem CECO can't solve. In addition,

we sell, rent and service the finest professional

photographic equipment. Your patronage is

always appreciated—whether you make a major

purchase or buy a bottle of film cement.

*CECO—Trademark of Camera Equipment CO

FRANK C. ZUCKER

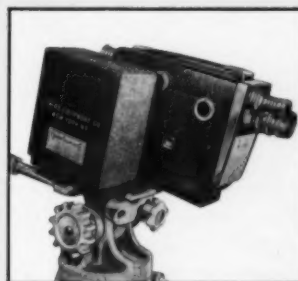
CAMERA EQUIPMENT CO., INC.

Dept. 3 315 West 43rd St., New York 36, N. Y. JUDSON 4-1420



GAUMONT-KALEE Transistorized Magnetic Sound Attachment for ARRIFLEX 16

Converts ARRIFLEX 16 into a single system magnetic sound camera unit that's compact, lightweight, well-balanced. Unit is mounted between camera and tripod head. Transistorized amplifier. ARRI can still be used as silent camera by simply removing sound attachment.

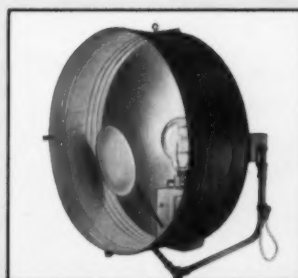
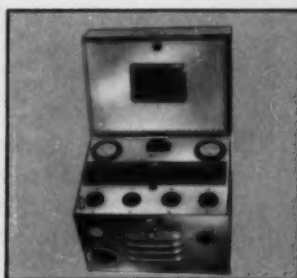


110 Volt AC Synchronous Motor for Kodak Model K-100 Camera

A fine, precision motor that drives camera at exact sound speed of 24 fps. Easy to attach, no special tools required. Synch motors for other cameras available.

Colortran Master "Chief" Converter

Has every improvement and convenience feature for motion picture work. Portable, yet large in capacity. Can be used as master control panel to set up individual line intensity variations. 30 amps from 220 volts; 45 amps from 115 volts.



CECO Cone Lights 5000 Watt —2000 Watt—750-1000 Watt

Floods large area with shadowless, soft light. Can be placed close to actors. Complete with switch, 25 ft. cable and yoke. (5000 Watt illustrated).

Additional Products

CECO offers the world's largest and most comprehensive line of professional cameras, accessories, lighting, editing, processing and animation equipment including: MAURER Products (Exclusive Distributor); Oxberry Animation Equipment; Cooke Speed Panchro Series II, Kinetel, Kinoptic, and Bausch & Lomb Baltar Lenses. Other products we carry are: Color Charts - Computers - Splicers - Exposure meters - Projectors - Screens - Marking pencils and pens - editors gloves - stop watches.

Rentals

Cameras - 16mm and 35mm

Editing Equipment

Lighting Equipment

Generators - Truck mounted or Portable

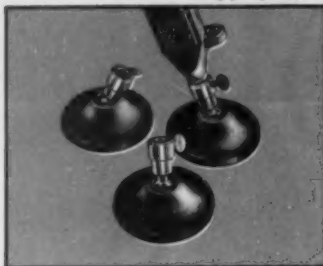
Sound Equipment

Projection Equipment

Grip Equipment

Sta-Sets

Made of the finest rubber in the shape of a suction cup, these Sta-Sets keep tripods from slipping on any slippery floor.



CECO Professional Junior Gyro Tripod

Features "controlled action" with slow and fast speeds for both panning and tilting. Only 19 lbs. Can be used as geared head. Ideal for 16mm Maurer, Mitchell, B&H Eyemo and similar cameras.

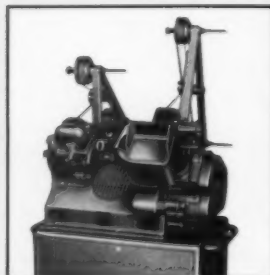


MOVIOLA Crab Dolly

The ultimate in camera mobility. Features crab, conventional and locked steering. Boom raised to 60" or lowered to 22" by hydraulic cylinder. 2 seats can be shifted to 6 different positions. All aluminum carriage. Length 64"; Width 34".

MOVIOLA Film Editing Machine "Series 20"

Available in several models to meet various requirements. Streamline-styled. Clear sound quality. Convenient to use. Large screen size. Short pieces can be used without putting film on reels.



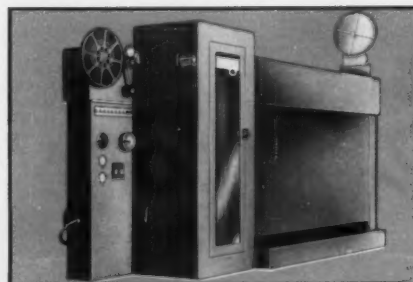
Ask about our Precision Repair and Design Engineering Service!

**SALES
SERVICE
RENTALS**

FRANK C. ZUCKER

CAMERA EQUIPMENT CO., INC.

Dept. 3 315 West 43rd St., New York 36, N. Y. JUdson 6-1420



FILMLINE Processor Model R60

Heavy duty Reversal and Negative-Positive processor with completely controlled processing. Has exclusive "Temp-Guard" system. Feed-in and take-up elevators for continuous operation. Output speeds to 3600' per hour. Other models available.

An eight-story building, an addition to Kodak Research Laboratories, Rochester, N.Y., to house the physics division of the Laboratories, is expected to be ready for use in 1961. The new unit will be of fire-proof structural steel with curtain wall exterior construction. Seven floors will be used for laboratories, research areas and staff offices. The eighth floor will be used for mechanical equipment and may include an observation platform for photographic research. Transfer of the physics division to the new building will release space in the main buildings for other research divisions, such as chemistry and applied photography. Physics research carried on by the Laboratories includes work in colorimetry, radiography, sound reproduction, sensitometry and solid state physics.

Classroom film: A total of 135 students in three sections of the basic social science course at Michigan State Univ. were questioned about their attitudes toward the use of film in the classroom. The results of the questionnaire are presented in an article in the *Audio Visual Communication Review*, Winter 1959, in an article, "Student Evaluation of Films Used in College Social Studies" by Louis W. Redemsky. Most of the answers to the questionnaire indicated a very favorable attitude toward the use of films. The students seemed to value discussion very highly and over half of them specified Monday as the best day of the week to show films.

Another article in the same issue, "Comparative Teaching Effectiveness of Radio and Television" by Lionel C. Barrow, Jr., and Bruce H. Westley is based on the results of an experiment designed to compare the relative effectiveness of equivalent radio and television versions of a series of background-of-the-news programs for grade school children. A total of 228 sixth-graders took part in the experiment. The TV group made significantly higher scores than the radio group on an immediate recall test of factual knowledge. The TV group's score on a delayed recall test six weeks after the last program still was higher than that of the radio group, but the difference was no longer significant.

The Syndicat Général des Industries Photographiques et Cinématographiques has presented portrait busts of Nicéphore Niepce and L. J. M. Daguerre to the American Museum of Photography, Philadelphia. Gift of a third bust, that of Fox Talbot is planned. The Museum is planning a move to larger headquarters and one of the features of the new location will be a Hall of Fame where the three busts will be displayed in positions of the greatest honor. The presentation of the two French busts was arranged by M. A. Landucci of the Syndicat Général following a visit last October by Dr. Louis Walton Sipley, Director of the Museum.

A picture Presentation Committee has been appointed by the British Kinematograph Society, 164 Shaftesbury Ave., London WC2, for the purpose of examining "the whole process of motion-picture presentation in its widest sense, and to report on improvements which could be effected

through the joint endeavors of all responsible parties in the fields of production, processing, distribution and exhibition." At the first meeting of the Committee, four main areas of interest were outlined: (1) Initial Release Print Quality; (2) Subsequent Deterioration; (3) Equipment; and (4) The Projectionist. Specific problems and failures in each category were defined by the Committee. The Committee plans to "assess the degree of culpability; pinpoint weaknesses; gather factual information; lay down the proper method of correction; and find a means of putting (it) in effect." A letter from the Committee Secretary, R. E. Pulman, notes "the magnitude of the task that has been undertaken,"

and states, "we are determined to achieve our aim."

A complete high school chemistry course on film has been announced by the American Chemical Society and Encyclopaedia Films Inc. The course, available this Fall, consists of 150 half-hour demonstration lectures in black-and-white or color. Based on data compiled over a year in chemical laboratories and studios, it was filmed at the Univ. of Florida under a grant from the Fund of the Advancement of Education. The presentation, which includes experiments and demonstrations not readily available in the average school, is intended to supplement present courses

The highest quality in Anamorphics . . . **DYALISCOPE**

Monobloc Taking Lenses

35mm 40mm 50mm 75mm 100mm

For all cameras and especially for
Mitchell BNC and NC - Eyemo
Camerette - Arriflex
Super Parvo Color - Came 300 Reflex

Used for hundreds of feature films in

France	Italy	Japan	Russia
China	Poland	Egypt	Spain
Belgium	Finland	Hungary	



Anamorphic Projection Lenses

for large theaters • DYALISCOPE PR 35
for small theaters • DYALISCOPE CHAMPION
for 16mm • DYALISCOPE JUNIOR
variable ratio 1:2 • VARIASCOPE

HIGHEST QUALITY IN ANAMORPHIC LENSES

for shooting and projection—8mm and 16mm

S. A. T. E. C.

11, Rue M. Franay / SAINT-CLOUD / MOLITOR 58-70/71

CABLES: DYALISCOPE, PARIS

and bring them up to date. A similar plan was used last year in preparing a physics course.

The Animated Television Commercial is the subject of a talk given by Adrian Woolery at the Dept. of Cinema, Univ. of So. Calif., April 23. Mr. Woolery has had 23 years' experience in the field of animation. He is president and owner of Playhouse Pictures, a Hollywood firm specializing in commercial and industrial animated films.

The 13th Congress of the International Scientific Film Assn., 3 Belgrave Sq., London SW1, will be held in London and Oxford, Sept. 23 - Oct. 2. Plans are for the delegates to assemble in London for the opening ceremonies and reception and to proceed to Oxford for the remainder of the Congress. It is expected that over 200 films on research, medicine, education and popular science subjects will be screened during the Congress and its accompanying Festival. The award-winning films will be shown at the National Film Theatre, October 2.

The second annual Audio-Visual "Crack-erbarrel" Openhouse arranged by Harwald Co., 1245 Chicago Ave., Evanston, Ill., covered in lectures and discussions a variety of audio-visual applications in the fields of business, psychology, education, government and religion.

Speakers included Ott Coelln, Editor and Publisher of *Business Screen Magazine*, John Flory, of Eastman Kodak Co.; Bill Kruse, public and trade relations counsel for *Educational Screen and Audio-Visual Guide*; Philip Lewis, of the Chicago Board of Education; Maurice Mitchell, President of Encyclopaedia Britannica Films Inc., who reported on the National Defense Education Act; Walter Wittich, of the University of Wisconsin; Cliff Welch, of the Naval Training Aids Center, San Francisco; Al Moses, of Army Pictorial Service, who spoke on "Progress and Problems in Military Audio-Visuals"; Pearl Rosser, President of the Baptist Missionary Training School, who spoke on "Audio-Visuals in Religious Education"; and other experts in audio-visual fields.

A demonstration of the Harwald Ultrasonic portable projection booth for classroom use was given by Dick Wallace. Plans are being discussed for a third such Open House next February.

The School of Radio Technique Inc., 316 W. 57 St., New York 19, was purchased by members of its faculty and staff after the death of its founder, John F. Gilbert, in March. Robert C. Stebbins, who is Dean of the school, has been elected President and Director. B. Anne Trayfors is Vice-President in charge of publicity and advertising. Plans are underway to expand the curriculum to include additional courses in broadcasting arts and sciences in the fields of radio and television.

Plans for a \$20 million laboratory to be built at Holmdel, N.J., have been announced by Bell Telephone Laboratories. The new building will be constructed on a 430-acre site owned by Bell Laboratories

since 1929. Buildings presently on the property provide working space for about 150 scientists, engineers and staff. Architect for the new building is Eero Saarinen. Occupancy of the first portion of the building is expected in 1961.

The Proceedings of the Institute of Radio Engineers has devoted its May 1959 issue to the subject of government research. The 350-page issue contains articles by leading radio-electronic authorities in the United States and Canada describing research now underway and results that have been accomplished in Government laboratories and on government-financed projects. Included are articles on wave propagation and solid-state, developments involving microminiaturization and reliability, and applications in such fields as medical electronics. The issue features an editorial on the work of the Federal Council by James R. Killian, Jr., Special Assistant to the President for Science and Technology.

The Visit of Queen Elizabeth II to Ghana during November will be broadcast through the cooperation of Marconi's Wireless Telegraph Co. Ltd. of Chelmsford, and Pye Ltd. of Cambridge, under an agreement with Ghana Broadcasting Authorities. The station will be located in Accra and the service will operate on a 625-line standard.

The Veder Prize has been awarded to three employees of Philips-of-the Netherlands for outstanding contributions in the field of radio engineering. The Veder Fund, established by Mr. Veder of Rotterdam, each year presents an award to the person or persons who, by their scientific work, have "won their spurs" in radio engineering. The prize-winners are: K. de Boer, D. Kleis and M. Vermeulen. Dr. de Boer was honored for his research in stereophonic sound reproduction. Messrs. Vermeulen and Kleis were honored for their work on artificial reverberation.

Oliver Berliner, internationally known author and sound systems authority, has been appointed a director of Studio Electronics Corp. of Burbank, Calif. Mr. Berliner is the grandson of Emile Berliner, inventor of the microphone and disk phonograph record. His activities as director will include acting as sales manager and advertising director.

Edgar Snow has been appointed Managing Director for Westrex Co., Orient, a division of Litton Industries, with offices in Tokyo. Mr. Snow's qualifications include more than 10 years residence in Japan. He lived there as a child and returned to serve with the U.S. Naval Technical Mission. He served in a civilian capacity with the Army from 1949 until 1954.

Jack Clink has been named Director of Sound Services for Byron Motion Pictures Inc., Washington, D.C. For the past 25 years, Mr. Clink has been active in the field of sound. He was originally associated

Obituary

P. A. McGuire died January 20 at Amityville, L. I., N. Y. at the age of 84. For 30 years he was advertising manager and public relations counsel, first for Nicholas Power Co., and subsequently for the firm which absorbed this enterprise, the International Projector Corp. He was a member of the Society during the years 1931-1949 and attained the rank of Fellow. He was active in the Projection Advisory Council and was a member of a number of civic and fraternal organizations.

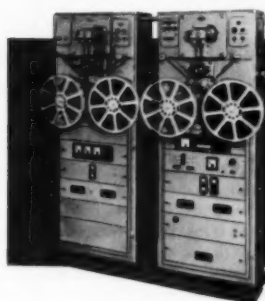
with the M-G-M Sound Dept. in Hollywood. During World War II, he became one of the original members of the Army Pictorial Service. Following World War II he joined the staff of Edgar Monsanto Queeny and participated in various expeditions in British East Africa and the Sudan for the American Museum of Natural History.

A demonstration of stereophonic sound by the National Broadcasting Co. in cooperation with Bell Telephone Laboratories is part of an RCA Victor "Save on Stereo" campaign. The demonstration took place Feb. 28, during the 8:15 to 8:45 P.M. portion of the Perry Como Show. In stereo simulcast, sound signals are picked up by microphones placed on each side of the studio stage. Sounds from microphones on the left side of the stage are transmitted over the TV audio channels while those on the right side are carried over the radio sound channel. The combination of signals produces stereophonic sound for listeners who have placed an AM or FM radio receiver about eight feet to the right of their TV sets. To assure simultaneous reception of stereo sound, a special network of radio lines were installed parallel to the route of the TV network. The networks were provided by the Long Lines Dept. of American Telephone and Telegraph Co. Video tape with two soundtracks was used for delayed broadcast in different time zones.

Zeiss Ikon's "Picture and Sound" issues for January and February, 1959, contain numerous tutorial articles and descriptions of equipment:

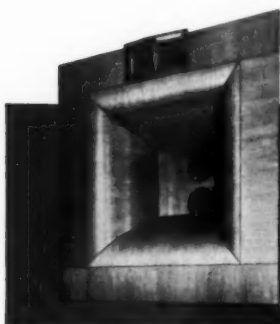
- "Across Europe — on the platform of a locomotive...made possible by a new method of filming"
- "Xenolite, an inexpensive xenon lamp for small-sized cinemas"
- "Marking the film reels"
- "Control desk for light and sound"
- "Cleaning optical equipment"
- "Zeiss Ikon Slide Automat"
- "New Zeiss Ikon Amplifiers employing transistors"
- "Ernemann IX, in a different make-up"
- "A new tweeter system"
- "Remote focusing control of the projection lens"

**Survey of the manufacturing program
of Sound and Film Division**



Sound film equipment, KLANGFILM system, for film and television studios.

Microphones, mixing and control consoles, sound recording and reproducing equipment for optical sound, magnetic sound and stereophonic film, amplifier equipment in pivoting gate cabinets, ROTOSYN synchronizing equipment, striping and printing equipment for magnetic sound film.

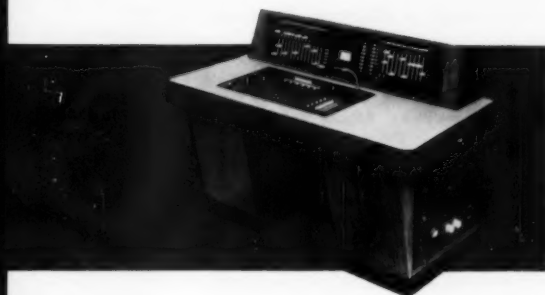


Sound film equipment, KLANGFILM system for film theaters.

Sound reproducers for optical sound and one to six-channel magnetic sound, plug-in preamplifiers of modular design, amplifier equipment in pivoting gate cabinets for up to 6 channels, loudspeaker assemblies, inductive hearing aid equipment, EUROMAT control equipment for automatic film exhibition, arc lamp metal rectifiers, cinema carbons SIPLALUX and cinema screens.

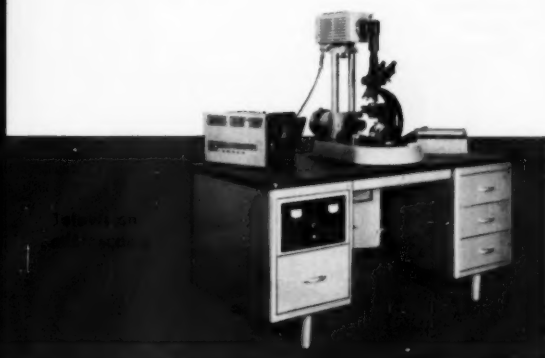
TF 163 E

**Siemens products
cover the total line
of electrical engineering**



Electro-acoustic equipment.

Microphones, control desks, ELADYN preamplifiers and power amplifiers, amplifier systems in pivoting gate cabinets for single-channel and stereophonic transmission, plug-in studio amplifiers of modular design, loudspeakers and sound battens, simultaneous interpreter systems, sound equipment for broadcast studios and theaters.

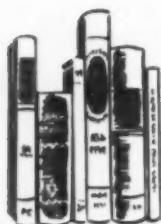


Industrial television equipment.

For application in industry, commerce, traffic and general information work, TELESCHek equipment for banking and financial institutions, underwater television equipment, Zeiss microscope with Siemens television equipment.

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR MESSTECHNIK • SOUND AND FILM DIVISION
KARLSRUHE • WEST-GERMANY

books reviewed



Fundamentals of Electron Devices

By Karl R. Spangenberg. Published (1957) by McGraw-Hill Book Co., Inc., 330 West 42 St., New York 36. 505 pp. including appendices, bibliography, and index. 6 by 9-in. Price \$10.00.

In this book, the development of the physics of electron tubes and semiconductor devices is presented as a unified structure which rests upon the common base of the theory of semiconduction action.

The extreme care which has obviously been taken in the selection of text material and wording indicates that the author spent many hours in its preparation. As a result, the material cannot easily be misinterpreted, although it must be carefully and

completely studied to achieve an understanding of the subject.

Approximately one-third of the book is devoted to the basic physical theory underlying both transistors and electron tubes, with emphasis on their similarities rather than their differences. Following this, about one-third of the book is used to present the devices and their characteristics, including electron tubes, semiconductor diodes, transistors and photoelectric devices. It should be noted that a number of the newest types of transistors such as the mesa and microalloy are not included, nor are the newest advances in electron tubes. This is not, however, a serious deficiency, since the same theory is applicable to these newer devices.

Following the discussion of the devices themselves, the author provides a detailed treatment of equivalent circuits and both small and large signal operation and characteristics, while the final few pages are devoted to a discussion of noise. It is this section which will be of the greatest interest to engineers concerned with the use of electron devices in new applications, and which must be studied rather than merely read to understand the derivations and analyses. The thirteen appendices contain detailed development and mathematical treatments of a number of relationships such as the Diffusion Equation and the Fermi Distribution Function which are used in the main part of the text. Engineers concerned primarily with the applications of the devices

can, without losing much, neglect these appendices.

Although intended as a textbook for a third or fourth year college course, the book will also prove valuable for those who have had engineering experience and wish to become familiar with the theory and concepts of semiconductors. Much of the present-day instrumentation equipment is being redesigned to take advantage of desirable transistor characteristics, and "transistorizing" of television and sound equipment is barely beginning. Recent advances in both high-power and high-frequency transistors should tend to accelerate this transformation, and the material contained in the book represents very nearly the minimum of knowledge for the development engineer. For the engineer who is, or will be, associated with electron devices, this book provides an excellent means of becoming familiar with the concepts, advantages and limitations of semiconductor devices and electron tubes. The emphasis on the similarities between these devices provides the link which should enable an engineer familiar with vacuum tubes to relate the two, although more examples illustrating the theory would have been desirable for a self-study program. In short, the book is a well-written, clear, and concise text which should be of value to many engineers—Harvey W. Mertz, Philco Corp., 23d and Lehigh Ave., Philadelphia 32.

reverberation missing?



EMT 140 Highlights:

- 0.8 to 5 seconds instantly selectable
- Effect!
- No coloration (This is a natural)
- Minimum volume for maximum reverberation
- Easy 600 ohm insertions (zero loss)
- Minimum maintenance (tube changes)

Write for a free copy of Dr. Kuhl's article describing technical and acoustical wherefores, and send us a tape containing samples upon which we will place some reverberation.

electronic applications, inc., 194 Richmond Hill Ave., Stamford, Conn.

Viditon Corporation Limited, 384 Bank Street, Ottawa 4, Canada

In Chicago: Ray R. Hutmacher Associates, Inc., 6647 N. Oliphant Ave., Chicago 31, Illinois

In Dallas: Audio Acoustics, 130 Fairview Drive, Arlington, Texas

In Los Angeles: Ralph Auf der Heide, P. O. Box 201, Altadena, Calif.

In Miami: Dukoff International Sound Corp., 1625 Bay Road, Miami Beach, Fla.

In New York: Harvey Radio Co., 103 West 43rd Street, New York

In San Francisco: Ron Marco, 2880 Ridgeway Avenue, San Bruno, Calif.

INTRODUCING

The PERFECTONE EP6A Sound Recorder

... a Revolutionary New Sound System



The EP6A Perfectone Recorder is a professional 1/4" fully transistorized synchronous tape recorder

Mechanical Data

13" wide, 9" deep, 4 1/2" high

Total weight, including batteries, 13 pounds

Tape speed, 7 1/2" per second

Tape capacity, 5" reels

Two motors. One for tape drive and one for rapid rewind

Equipment consists of a bank of interchangeable heads, comprised of an erasing head, a recording head, a playback head, and a synchronous head on the synchronous unit. Power 12/18 volts either by self-contained dry cell batteries or external source. Total power consumption 4 watts.

Frequency characteristics
between 30 and 12,000 cycles

Signal to noise ratio
55 DB relative to 2% distortion level

Wow and flutter RMS value
better than 0.10%

Synchronization is by means of a 120 cycle frequency generated by the camera motor. This frequency is recorded on both edges of the tape, in push-pull, to prevent induction with the sound track. The 1/4" tape is transferred to either a 16/35mm magnetic or 16/35mm optical recorder through a synchronizing amplifier which converts the 120 cycle into 220 volt three phase 60 cycle power of sufficient wattage (300 VA) to drive the recorder.

Synchronization is held to within one perforation.

The EP6A Perfectone recorder is also available as a non-synchronous unit.

World Sales Agents **ECLAIR** 12 Rue Gaillon, Paris, France

Agent for United States and Canada **RYDER SOUND SERVICES, INC.**
1147 North Vine Street, Hollywood 38, California

Photographic Sketch Book of the Civil War

By Alexander Gardner. Published (1959) by Dover Publications, Inc., 180 Varick St., New York 14. 100 plates, text and index. 11 by 8½-in. Price \$6.00.

Among the spate of books already being published in anticipation of the centenary observances of the Civil War this Sketch Book should be of special interest to all those who, professionally or otherwise, are fascinated by the historical development of the photographic art. Originally published in 1866, this collection of photographs is one of the rarest of all Civil War photo-

graphic collections, probably less than ten copies being still in existence.

The pictures, made by Gardner while he was in the employ of Mathew Brady and later, after he had established his own organization, are accompanied by a descriptive text attributed to Gardner himself which effectively conveys the flavor of the period. For photographic historians, there is complete documentation on each photograph, including the maker of both the positive and negative plates, and an explanation of photographic processes in use at the time. Makers of documentary films dealing with Civil War subjects will find this a valuable source of pictorial material.

Historical Costumes of England from the Eleventh to the Twentieth Century

New ed., with new illus., by Nancy Bradfield; published by George C. Harrap, Great Britain, 1958, and Barnes & Noble, Inc., New York, 1959, 184 pp., \$6.00.

For the technical man who may become involved, however unexpectedly, with theatrical production, this book could be a mighty handy tool. Tersely written, it is practically encyclopedic in details. Colors and textures are specified, pen-and-ink drawings tell the design story directly and easily. A table of contents listing the 36 royal reigns spanned by ten centuries affords quick reference, and marginal headings help locate particular details. Although the costumes are specifically English, generalities can be applied to American and European costumes contemporary with any given period.

Progress in Photography 1955-1958

D. A. Spencer, Editor-in-Chief. Published (1959) by Focal Press Ltd., 31 Fitzroy Sq., London W. 1; in U.S.A., by The Macmillan Co., 60 Fifth Ave., New York 11. 167 pp. incl. illus. & index + 7 tip-in illus. 7 by 9½-in. Price \$10.00.

This is the third, and last, volume of the series whose objective has been to bridge the gap of over ten years in which records of progress in different countries have not been readily available. Listing the contents of the six sections of the present volume proves the format.

Section One, Practice and New Techniques, has four chapters: Zerygraphy; Image Transfer Processes; Thermo-Fax; Amateur Colour Print Processes. Section Two, Photographic Theory and Materials, has these four chapters: Photographic Sensitivity and Latent Image Formation; Mechanism of Development; Russian Work on the Theory of Photographic Emulsions (by K. V. Chibisov); New Film Supports.

Section Three, Business, contains statistics on the industry in Belgium, France, West Germany, Great Britain, Italy, Japan and U.S.A. Section Four, Literature, has brief chapters on Photographic Libraries and Archives and on Historiography of Photography (by Beaumont Newhall), and 20 pp. on Russian Literature on the Photographic Process (by V. I. Sheberstov).

Section Five, Applications, contains a concise chapter on New Methods of Motion Picture Presentation (by Gordon A. Chambers), and chapters on Photographic Photometry and on Photomechanical Resists. A list of Periodicals Cited in Literature References and the Index complete the volume.

The volume will obviously have great value for a variety of researchers, marketers and some students; but, true to its announced purpose, it does not provide more than a catching up in the areas noted. The publishers announce in the Introduction to the volume their plans for succeeding publications which are to be two.

A quarterly, called *Perspective*, will contain articles in the various fields of photog-



OUR EXPERIENCE IS YOUR KEY TO SERVICE & DEPENDABILITY



CAMART TV CAMERA DOLLY Model 111-B

• Boom arm smoothly raises and lowers boom so that you can film while the camera is being moved. Can be lowered to 2 ft. or raised to almost 8 ft. high.

• Four rubber tired 10" ball bearing wheels for smooth silent movement in alignment for use with dolly tracks. Locking device for straight run.

• Counter balanced spring action permits accurate balance for any motion picture camera with blimp or standard television camera.

Dolly Tracks Available **\$1975.00**



CAMART EDITING TABLE

Custom-built all welded steel construction, genuine formica top. Built in lite-well with ¼" frosted plexiglass cover, drawer, electric outlet box, bottom rack. Measures 24 X 30 X 60. **\$99.50**

Other Sizes to your specifications. Prices on Request.



CAMART DUAL SOUND READER MOVISCOP Model SB-111

Complete with optical sound reproduction head, (choice of magnetic sound) base plate, amplifier-speaker. For single or double system sound. Easy to handle, no twisting film. An unbeatable combination with the Zeiss Moviscop 16mm precision viewer, sharp brilliant 2¼ X 3¼ picture.

Dual Reader (without Viewer) **\$195.00**
Zeiss Moviscop Viewer **\$94.00**
Special Reader-Viewer Comb. **\$269.50**



the CAMERA MART inc.

1845 BROADWAY (at 60th St.) NEW YORK 23 • Plaza 7-6977 • Cable: Camarmart

raphy, cinematography and other methods of image and sound recording. Each article is to provide a general account of its area and list references for those who would pursue the matter further. *Perspective* will also publish digest or extracts from the current literature.

Independent of the quarterly but allied and complementary in aim, the publishers plan a series of monographs called *The Progress Library of the Science and Applications of Photography*, to be written by specialists for specialists.

British Broadcasting: A Bibliography (1958) published by the British Broadcasting Corp., Broadcasting House, London W.1. replaces *Books About Broadcasting*, published in 1948. The 49-page bibliography lists books published in Great Britain on television, with the exception of those on engineering. The bibliography also lists selected articles, Parliamentary debates and government and official publications relating to B.B.C. Subject categories include: Monopoly and Commercial Broadcasting; Art and Technique of Broadcasting; Biography; and Finance. The bibliography is priced at 5 shillings.

SMPTE Lapel Pins. Gold and blue enamel reproductions of the Society symbol, with screw back. Available to all members from Society headquarters. Price \$4.00 incl. Fed. Tax; in New York City, add 3% sales tax.

Translated Abstracts From Foreign Journals

The *Journal* is scheduled to publish from time to time lots of abstracts such as these, chiefly from U.S.S.R., from the *Kodak Monthly Abstract Bulletin*.

Electronic Image-Intensification

Electronic image-converters based on photoelectric emission are used to intensify images, and on the score of definition and contrast, they satisfy the highest requirements of cinematography. The low threshold illumination and great intensification obtainable with cascade converters allow one to count on a lowering of the illumination necessary for exposure by a factor of 1000 or more. This makes it possible to film under practically any circumstances of lighting. The time has come to turn to the practical consideration of this problem. The use of electronic image-converters and TV techniques opens up new technical possibilities in film-making. (Translation of Author's Abstract, S. C. G.)—A. M. Khalfin, *Tekh. Kino i Televideniya*, pp. 10-19, Sept. 1958.

Machines for Coating Ferromagnetic Suspensions on Motion-Picture Film

Two machines have been built in the Moscow Constructional Bureau for Motion-Picture Apparatus for coating magnetic suspensions of 35mm, 16mm and 32mm

film. They are claimed to be better than the foreign machines known, in quality of construction and the high level of automatization. The constructional details of the 16mm machine and its control system are given. The 35mm machine is not essentially different, and so is not described in detail. (S. C. G.)—K. Kh. Sutyushev and M. B. Khalameizer, *Tekh. Kino i Televideniya*, pp. 57-63, Sept. 1958.

New Methods and Apparatus for Testing Cine Cameras

The apparatus described is an autocollimator into which are inserted, in turn, three transparent test objects, with appropriate illumination. The camera is aligned and exposures are made. The first test object is intended to determine frame stability, the second to test the accuracy of setting of the distance scales on the objectives, and the third to check the correspondence between the framing of the viewer and the framing of the film. The overall length of the apparatus does not exceed 600 mm and the test objects are 220 and 160 mm in size. A design for a general-purpose autocollimator is given. (S. C. G.)—O. I. Reznikov, *Tekh. Kino i Televideniya*, pp. 62-65, Nov. 1958.

The Relation Between the Resolution of Fine Detail after Multiple Copying and the Character of the Light-Beam Used

A duplicate-positive film, a duplicate-negative film and a motion-picture-positive

COMPREHENSIVE SERVICE CORPORATION



A SINGLE SOURCE
FOR MOTION PICTURE
EQUIPMENT
AND SUPPLIES

245 WEST 55TH STREET, NEW YORK 19, N.Y.

CALIFORNIA BRANCH: 6674 SANTA MONICA BOULEVARD, HOLLYWOOD, 38

film were studied. Beginning with the contact printing of a line test-object on to the duplicate-positive film, further printings were made in the order: duplicate-negative, duplicate-positive, duplicate-negative, final positive. For printing, white light or ultraviolet radiation was used, either in a diffuse or a parallel beam. Exposures were chosen at each stage so as to obtain the maximum resolving power. The resolutions obtained at each stage in the different methods of printing are tabulated. Resolving power decreased at every stage of the repeated printing, but the fall was most marked in the first two stages. Ultraviolet radiation gave about twice the resolution obtained with white light, and a further improvement was obtained by using a

parallel instead of a diffuse beam. An experiment with a microcopying film indicated that the correct choice of illumination was more effective in improving resolution than using a material of higher resolving power. (S. C. G.)—I. I. Breido and L. V. Kruglyakova, *Zhur. Nauch i Priklad. Fotografii i Kinematografii*, 3: 359-62, Sept./Oct. 1958.

An Infrared Reversal Film for Special Effects Cinematography with the Traveling-Matte Technique

The new, Russian-made infrared reversal film, Type 2, has its maximum sensitivity in the zone, 805-810 mμ. It has three coatings, the lowest of which is a colloidal silver layer, with an optical density of at least

two, which intercepts any infrared radiation penetrating the base. The emulsion layer is coated on this and a gelatin protective layer forms the third. The actor is filmed against an infrared reflecting screen with a double-exposure camera and color film (unaffected by infrared) and the masking film. The latter is reversal-processed to give a dark mask on a transparent background, and is then used over the still undeveloped color film to shoot the required background. The sensitometric properties of the film are discussed. (S. C. G.)—A. M. Churaeva, *Tekh. Kino i Televideniya*, pp. 10-15, Oct. 1958.

A Unit for the Transcription of Magnetic Stereophonic Soundtracks onto Wide-Screen Film Prints

An outline is given of the principles on which was based the development of the Type KMP-1 machine for the transcription of magnetic stereophonic sound-tracks. Technical data are supplied and the basic elements of the unit are described. (Translations of Authors' Abstract, S. C. G.)—G. K. Khanova and Z. Lyubman, *Tekh. Kino i Televideniya*, pp. 38-41, Nov. 1958.

Composite Pictures with a Single Exposure

A simple attachment to a cinematograph camera consisting of a transparency holder, a semitransparent mirror, and a supplementary lens allows a composite picture to be made of action against a transparency background, in a single filming operation. (S. C. G.)—B. G. Khrennikov, *Tekh. Kino i Televideniya*, pp. 38-41, Nov. 1958.

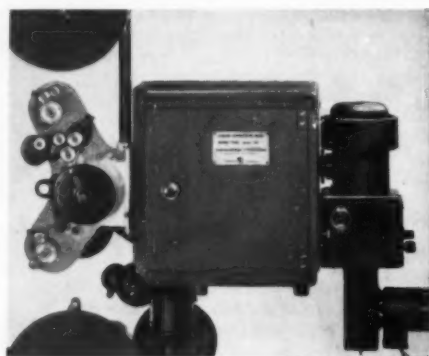
Picture Sharpness in Cinematography and Television

It is shown that test-object measurements do not give a complete presentation of the resolving power of a motion-picture film. The number of effectively different elements in the height of the screen under conditions of ideal frame stability and small viewing distances agrees well with the number of effectively different elements of the soundtrack within the height of the frame. The picture quality is best at the smallest distance at which image defects—the screen structure in television, and instability of the image in cinematography—just become unnoticeable. At such distances, equal to 4 to 6 times the height of the screen, the number of effectively different elements of the picture in the height of the screen, determined by the contrast pattern of alternating white and black lines, is equal to approximately 400, both in television and in cinematography.

It is shown that the subjective evaluation of a pictorial image is greatly influenced by the overall picture quality, the rendering of intermediate tones, the presence of interference, and other causes. Because of this, in order to obtain the greatest sharpness in the rendering of a pictorial subject, it is necessary in the first place to ensure the correct reproduction of intermediate tones, without which a simple multiplication of the number of scanning lines cannot give a real increase in quality. (Translation of Author's Abstract, S. C. G.)—Yu. M. Braude-Zolotarev, *Tekh. Kino i Televideniya*, pp. 4-9, Dec. 1958.

HIGH-SPEED HEAD

Supplied to fit existing B&H Contact Printers Model D (35mm) or J (16mm) in your own shop



Size: 15" x 15" x 12"

Continuous Black-and-White Printing at 200 ft. per minute

This compact high-speed head uses a single light source. Lamphouse is designed for a 1000-Watt T-12 bulb with blower. Bulb alignment easily made in darkness by adjusting three knobs, providing for vertical, transverse and rotational motion of the bulb.

One electro-mechanically operated light valve provides changes in 6 milli-seconds which show as a scene change flash of 1/2 of a frame. The light valve is controlled by 5 small solenoids to provide 32 printer steps of .025 or .030 Log E. Light valve opening may be adjusted to compensate for stock changes without altering the 32-step arrangement. Head can also be used for color printing with balanced inter-colored negative.

Optical system, contained in the casting, provides uniform light on the aperture of the B&H transport. Due to a cold mirror of the effective interference type, very little heat reaches the printing aperture. Heat absorbing glass is eliminated.

No skilled technician is required to operate the head. Entire programming of scene-to-scene changes, including start, stop and lap dissolves, is automatically accomplished by the use of an 8-hole punched tape reader and memory unit. This one-channel memory unit, with reader for automatic operation of the light valve, stores the introduced information, using an 8-hole punched tape reader. It permits the printing of scene changes as small as 3 inches in length and storing of 32 printer steps plus start, stop and lap dissolves. For easy servicing, commercially available 8-hole punched tape reader is used as a base.

Head with lamphouse and blower, ready for mounting to the B&H pedestal and transport Model D or J \$5,500
One-channel memory unit with reader \$1,650

All prices F.O.B. New Rochelle, N.Y.

FISH-SCHURMAN CORPORATION, 85 Portman Road, New Rochelle, N. Y.

AUTOMATIC OPERATION

Standard punched-tape units have been recoded and modified to bring about automatic operations of film printing equipment. Punched tape performs the functions of discrete scene-to-scene light changes, dissolves shutter operation and automatic stopping equipment, adjusts light level and printer characteristics for any particular job. Complex printer operations may be performed with great accuracy at high speeds.

•
Write for further information
•

NEW MAGNAPHONIC SYSTEMS COMPONENTS from Magnasync

STUDIO MIXING CONSOLETTES

Specifically designed for motion picture re-recording applications

A miniaturized studio mixing console with six input channels and patch bay selection of three program equalizers. Up to three plug-in microphone pre-amplifiers may be optionally added. Line amplifier has input and output level controls; "film-direct" monitor switch with film gain control, and matching blank panels are provided for custom additions.

GENERAL SPECIFICATIONS:

Modular construction of cabinet and components, optional plug-in microphone pre-amplifiers, and hinged top door for complete accessibility to all components.

Frequency response: 20 to 20,000 cps, ± 1.5 db.

Signal-to-noise ratio: 70 db below program level.

Distortion: Less than 0.5% total harmonic.

Output level: Maximum 20 dbm.

Power consumption: 80 watts.

Size: 34½" width, 24" depth, 14" height.



Model G-963 . . . \$1475.00

with in-line (triple) equalizer

Model G-961 . . . \$1195.00

with single equalizer



PROGRAM EQUALIZERS

Specifically designed for magnetic recording and reproduction. No maintenance required . . . all components except switches are sealed and encapsulated. Guaranteed performance.

GENERAL SPECIFICATIONS

Impedance: 600 ohms.

Switching: Silent "IN-OUT" with 14 db loss pad.

Insertion loss: 14 db.

Immediate delivery

Input level: -70 dbm min., +20 dbm max.

Controls:

Low frequency, 8 positions in 2 db steps.

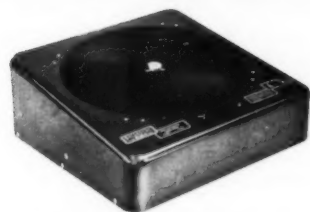
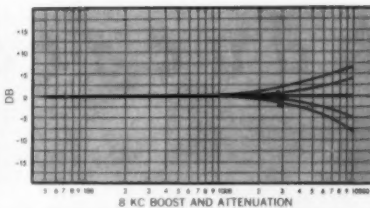
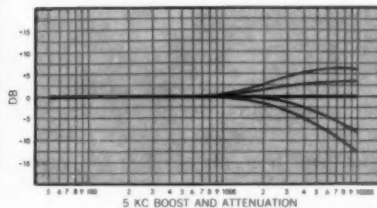
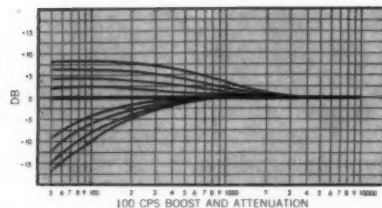
High frequency, 8 positions in 3 db steps.

Mounting: Standard WE hole spacing.

Size: 19" x 3½" x 3½".

Model G-801, Single Equalizer \$159.50

Model G-803, In-line (triple) Equalizer . . . \$395.00



TURNTABLE DEGAUSSER

semi-automatic—total erasure

Immediate delivery

For all magnetic films and instrumentation tapes

Model A-937 DEGAUSSER features a predetermined 20-second timed cycle that completely eliminates guesswork. The pushbutton-controlled motor-driven turntable insures fast and complete bulk erasure and eliminates noise patterns which are generated by irregular rotational motion. \$159.50

Model M-937 MANUAL DEGAUSSER—smooth, free-wheeling turntable, will not damage edges of instrumentation tapes or films. \$119.50

Model G-936 CONVENTIONAL DEGAUSSER—
an effective bulk eraser economically priced. \$69.50



Write, wire or phone

MAGNASYNC MANUFACTURING CO., LTD.

5546 Satsuma Ave., North Hollywood, California • STanley 7-5493 • Cable "MAGNASYNC"

International leaders in the design and manufacture of quality film recording systems

DEALERS:

CHICAGO, Zenith Cinema Service, Inc.; LOS ANGELES, Bins & Sawyer Cine Equipment; NEW YORK, Camera Equipment Co.; SAN FRANCISCO, Brooks Camera Co.; BELGIUM, Brussels, S.O.B.A.C., S.A. (Societe Belge D'Applications Cinematographiques); BOLIVIA, La Paz, Casa Kavlin; BRAZIL, Rio de Janeiro, Mesblo, S.A.; CANADA, Toronto, Ontario, Alex L. Clark, Ltd.; DENMARK, Copenhagen, Kinovox Electric Corp.; ENGLAND, London, W-1, Delane Leo Processes, Ltd.; HONGKONG, Supreme Trading Co.; INDIA, Bombay, Kine Engineers; ITALY, Rome, Reportfilm S.R.L.; JAPAN, Tokyo, J. Osawa & Co., Ltd.; PAKISTAN, Karachi 3, Film Factors Ltd.; SWITZERLAND, Zurich 7/53, Rene Boeniger; THAILAND, Bangkok, G. Simon Radio Co., Ltd.

Watch for the announcement of our new "EDI-TABLE"

Generalized Light-Scattering Characteristics of Cine Screens

Formulae are derived for an averaged brightness coefficient, \bar{r} , characterizing the concentration of reflected light-flux within a solid angle of scattering. Examples of the calculation of \bar{r} are given for basic types of screen. Values of \bar{r} for the correct evaluation and choice of motion-picture screens are given. (Translation of Author's Abstract, S. C. G.)—M. V. Tsivkin, *Tekh. Kino i Televideniya*, pp. 26-31, Dec. 1958.

A Double-Plate Crystal Light-Modulator

The crystal light-modulator, making use of the change in birefringence of a crystal ($\text{NH}_4\text{H}_2\text{PO}_4$) in a varying electric field, has been under study for some time in the NIKFI laboratories as a device for recording sound on film. The two-plate, three-electrode form, which gives a greater dynamic range than the single-plate form, is analyzed theoretically. The best working conditions, the value of the polarizing voltage, and the harmonic distortion arising under these conditions are discussed. (S. C. G.)—G. S. Arushanov, *Tekh. Kino i Televideniya*, pp. 32-8, Dec. 1958.

Effect of Electrons on Multilayer Films

A three-layer, color, motion-picture film, Type B (presumably Russian), was exposed four different times to electron beams of 30-, 40-, 60- and 80-kv energy. It was found that electrons of different energies produce different colored images in the processed film. The 30-kv electrons pene-

trate no farther than the first layer, the 40-kv electrons expose the second layer, and the 60-kv and higher-energy electrons cause exposure of all three layers. Differences in exposure time affected the saturation but not hue to any appreciable extent. In addition, the reflected electron beam in a reflection electron microscope, using a 60-kv primary beam and a polished aluminum specimen, was passed through a magnetic analyzer and focused onto a strip of the same type of color film. A colored spectrum was produced on the film corresponding to the spectrum of energies in the electron beam. This indicated that many of the electrons lost more than half their energy in being reflected, but the authors make no attempt to evaluate the energy loss quantitatively. (J. F. H.)—N. G. Sushkin and Yu. M. Kushnir, *Zhur. Tekhn. Fiziki*, 28: 908-09, No. 4, 1958.

A Multilayer Color Cine Film with High Sensitivity for Use with Incandescent Lighting

A new, multilayer color negative Soviet film, LN-3, for cinematography in artificial light is described. It is said to be 2.5 to 3 times as sensitive as the earlier LN-2 Film, but other properties remain unaltered — the speed and gamma balance, contrast, fog, latitude and resolving power. In making the new film, a study was made of the causes of the appearance of a high magenta fog which prevented increasing the speed of the ammoniacal emulsions, and of methods of eliminating it. It was

found that the formation of the fog was aided by all factors tending to increase the solubility of the silver halide, especially at the contact between the emulsion (green-sensitive) and filter coatings. A considerable decrease in fog was obtained by introducing either citric or acetic acid into the emulsion, especially during digestion, the decrease in fog being the greater, the earlier the introduction of the acid. Contact between the emulsion and filter coatings was eliminated by the insertion of a gelatin intermediate layer. LN-3 Film is also suitable for use in daylight with a yellow Agfa-1 Filter, when, because of the lowering of the overall speed, it is no faster than DS-2 [Soviet?] daylight film. (Translated from *Referativnyi Zhur. Fizika*, p. 314, 1958, S. C. G.)—I. M. Kilinskii, *Trudy Vsesoyuz. Nauch.-Issled. Kinofotoinst.*, pp. 43-6, No. 5 (15), 1957.

Application of Vanadium Development to Television

Photographic development by vanadium salt solutions is useful for rapid processing of film in the field of television. A developer was produced by reducing electrolytically a solution of the following composition: sulfuric acid (95%), 68 ml; vanadium pentoxide, 40 gm; oxalic acid, 30 gm; and water up to 1 liter, at a current density of 250 amp per square meter and an applied potential of 6 to 8 v. The developer can be replenished by electrolysis and circulated in a developing machine. Fog was reduced considerably by the addition of

Educators...



- Make sure you get the most out of your 16mm sound films
- Use the standard tests your own projector repairman uses
- Measure your projector's performance yourself with the ...

16mm "JIFFY" TEST FILM

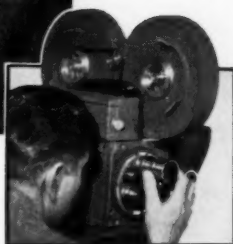


- Points up both projection and sound troubles
- Instruction booklet supplied with the film
- Test instruments are not required. Write ...

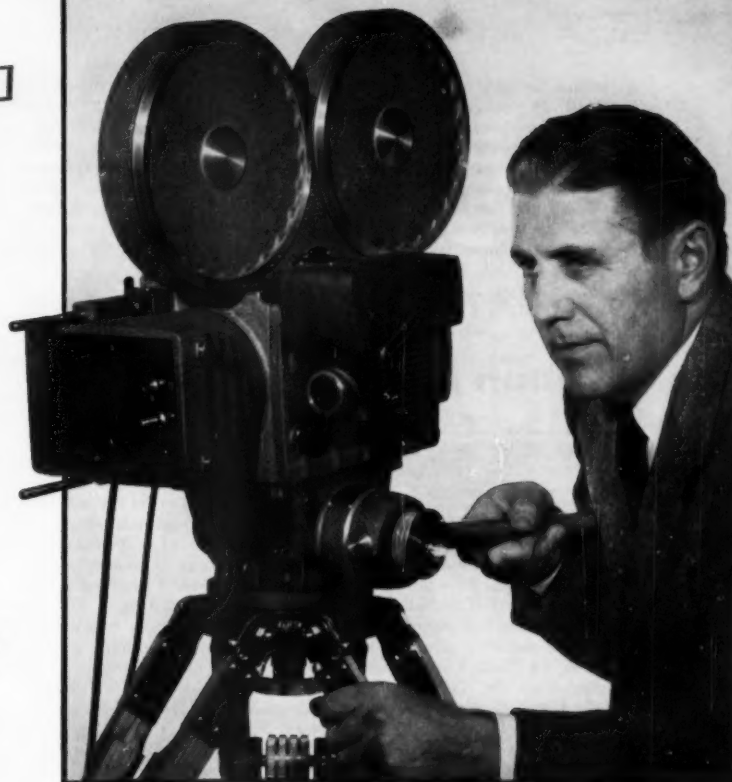
SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS
55 West 42nd Street, New York 36, New York



↑
"Auricon Pro-600"
with Single-Lens "C" Mount,
Tele-Finder Objective, plus
Standard Auricon Finder.



↑
"Auricon Pro-600"
with Critical Ground-Glass Focusing,
available on 3-Lens Turret Model.



Preferred by PROFESSIONALS... THE ALL NEW "AURICON PRO-600" with FILMAGNETIC® 16 mm sound-on-film® (OR OPTICAL SOUND-ON-FILM OPTIONAL)

- ★ Self-blimped for completely quiet studio operation. The whisper-quiet film flow of The "Auricon Pro-600" is silent proof of precision design. Your sound-recording microphone never picks up "Pro-600" Camera noise!
- ★ 600 ft. film Magazines with Auricon-Electromatic Take-up, for 16 minutes of continuous "Talking-Picture" filming.
- ★ Synchronous Motor Drive for "Single-System" or "Double-System" Recording.
- ★ \$1,871.00 list... for Auricon Pro-600 "Double-System" professional picture-camera with built-in features. Also available at added cost is "Single-System" equipment for Optical Sound-Track-On-Film, "C-mount" Lenses, View-Finders, Film Magazines, 3-Lens Turret, Critical Ground-Glass Focusing, Lens Sun-Shades, Tele-Finders, etc...
- ★ Sold with 30 day money-back guarantee, you must be satisfied!

Write for free illustrated "Auricon Pro-600" literature and price schedule.

Auricon
Hollywood

"Auricon Pro-600"
features Push-Button "On-Off,"
with safety-interlocked
film-flow mechanism.



↑
"Auricon Pro-600"
Turret Model with
"Zoom" type Lens
and Finder in use.

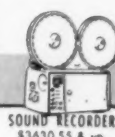
Auricon
Hollywood

Auricon

A PRODUCT OF
BERNDT-BACH, INC.

6946 Romaine Street, Hollywood 38, California

MANUFACTURERS OF SOUND-ON-FILM
RECORDING EQUIPMENT SINCE 1931



potassium bromide of 10 to 12 gm per liter, but not by organic antifoggants, such as 6-nitrobenzimidazole. A developing machine connected with a kinescope recording equipment and a television projector are described, in which film is developed only for 10 to 20 sec, at 15 C and the electrolysis of developer is controlled by a colorimetric method. (From *Chem. Abstracts*)—T. Kitagawa, K. Akaike, and K. Hiwatari, *J. Soc. Sci. Phot. Japan*, 20: 62-6, 1957.

section reports



The Canadian Section met on February 12 at the National Film Board Auditorium in Montreal. Al Turnbull, Chief Eng., Dominion Sound Equipment Ltd., addressed the audience of ninety on "Stereo Sound in the Theatre and Home." During his discussion Mr. Turnbull dramatically described and demonstrated stereo sound in the theatre. The National Film Board staff did a very fine job in installing excellent equipment to be used specially for this presentation.

The second speaker of the evening was Walter Sentleman, National Film Board,

was discussed "Special Photographic Effects and Allied Procedures." Now in charge of special effects at the National Film Board, Mr. Sentleman was previously in charge of production of special effects with Technicolor, London, J. Arthur Rank, and MGM Studios.—Ron E. Ringler, *Secretary-Treasurer*, DuPont Co. of Canada Ltd., 85 Eglinton Ave., E., Toronto, Ont.

The Canadian Section met April 14 at the National Film Board Auditorium in Montreal with an attendance of 70. Speakers were Wilton R. Holm, Photo Products Division, E. I. duPont de Nemours & Co. Inc., and Arthur Chetwynd, President, Chetwynd Films Ltd., Toronto.

The meeting opened with an early 16mm color film produced in 1952. The film was one of the first in Canada to be produced using 16mm anamorphic equipment. This served to emphasize the strides taken in the use of anamorphic lenses as outlined in Mr. Chetwynd's discussion of "The Practical Use of the 16mm Anamorphic Lens," which described the developmental testing required for the successful use of this medium in his company's present operation. Bob Brooks of the Chetwynd organization demonstrated the equipment. Examples of coaching film made for the Canadian Big Four Football League were shown following the demonstration.

Mr. Holm discussed "Sensitometry Principles and Practical Applications." His graphic concise outline of sensitometry and

its practical use in motion pictures did much to stimulate thought on a subject which is extremely vital in Canada at the present time.—Ron E. Ringler, *Secretary-Treasurer*, DuPont Co. of Canada Ltd., 85 Eglinton Ave., E., Toronto, Ont.

The Chicago Section opened the 1959 calendar year with an unusual symposium on the use of "Film in Sports," at its January 22 meeting. 53 people attended.

Participating in the symposium were Jack Gibney, Imperial World Films, Production Manager of "Wrestling From Chicago"; Sidney Goltz, Sid Goltz Associates, Producer of "All-Star Golf" and "Championship Bowling" and C. N. Hockman, Director, Motion Picture Production, University of Oklahoma, and Producer of "Inside Football with Bud Wilkinson."

Following the presentation of papers describing in detail the techniques and methods used in filming each of the sports events, the speakers formed a panel for further informal discussion and a question and answer period.

Demonstration films were particularly good and included a special color film prepared by Mr. Gobney illustrating highlights of the "Wrestling From Chicago" series, film excerpts from the "All-Star Golf" shows, and a 15-minute film from the "Inside Football" Library.

A coffee and coke session followed the meeting.—William H. Smith, *Secretary-Treasurer*, Lakeside Laboratory, Gary, Ind.



FRANCHISED PROCESSORS

California

CONSOLIDATED FILM IND.
900 Seward St., Hollywood 38
PERMAFILM OF CALIF INC.
6446 Santa Monica Blvd., Hollywood 38
M-G-M LABORATORIES, INC.
Culver City, California

Dist. of Columbia

TOM SHERIDAN, Jr.
4001 Connecticut Ave., N.W.

Illinois

GEO. W. COLBURN LAB.
164 North Wacker Drive, Chicago 6
EDWAL SCIENTIFIC PRODUCTS
420 West 111th St., Chicago 28
U. S. Photographic Distributor

New Jersey

CONSOLIDATED FILM IND.
Consolidated Park, Fort Lee

New York

COLOR SERVICE INC.
115 West 48th St., New York 36

CONSOLIDATED FILM IND.
521 West 57th St., New York 19

Canada

CANADIAN MICROFILMING CO.
33 St. James Street East, Montreal 1
NAT'L DRUG & CHEMICAL CO. LTD.
442 St. Gabriel St., Montreal

Argentina

LABORATORIES ALEX S.A.
Dragones 2250 (R5), Buenos Aires

Austria

KNOLL-K. G.
Vienna 4

Belgium

SONOREX S.A.B.
310 Avenue Van Volxem, Forest-Brussels
For Benelux Countries

Congo Belge

ETS J. HOURDEBISE
Radio Congo, Leopoldville

The Paramount Features on TV are Protected with Perma Film Protection

England

ZONAL FILM FACILITIES LTD.
The Tower, Hammersmith Broadway,
London W.8
U K & Australasia

France

SONOCOLOR S.A.
54 Avenue de Choisy, Paris 13

Germany

INTERNATIONAL MEDIA CO.,
G. M. B. H.
Sprestrasse 9, Darmstadt

India

PATEL INDIA PRIVATE LTD.
190 Hornby Road, Bombay

Israel

GEVA FILMS
32 Allenby Road, Tel-Aviv

Italy

PERMAFILM OF ITALY LTD.
Via Francesco Denza, 13-15, Rome

South Africa

PHOTO AGENCIES (PTY) LTD.
123 Jeppe Street
Johannesburg

Spain

MAGNISON-SONOCOLOR
Menendez Pelayo 163, Barcelona &
Madrid

Switzerland

CINEGRAM S.A.
3 Rue Beau-Site, Geneva 13

Venezuela

LABORATORIOS GAMA-FILMS, C.A.
Avenida Beethoven, Edificio Sur-America
Colinas de Bello Monte, Caracas

PERMAFILM Inc.

723 Seventh Avenue

New York 19, N. Y.

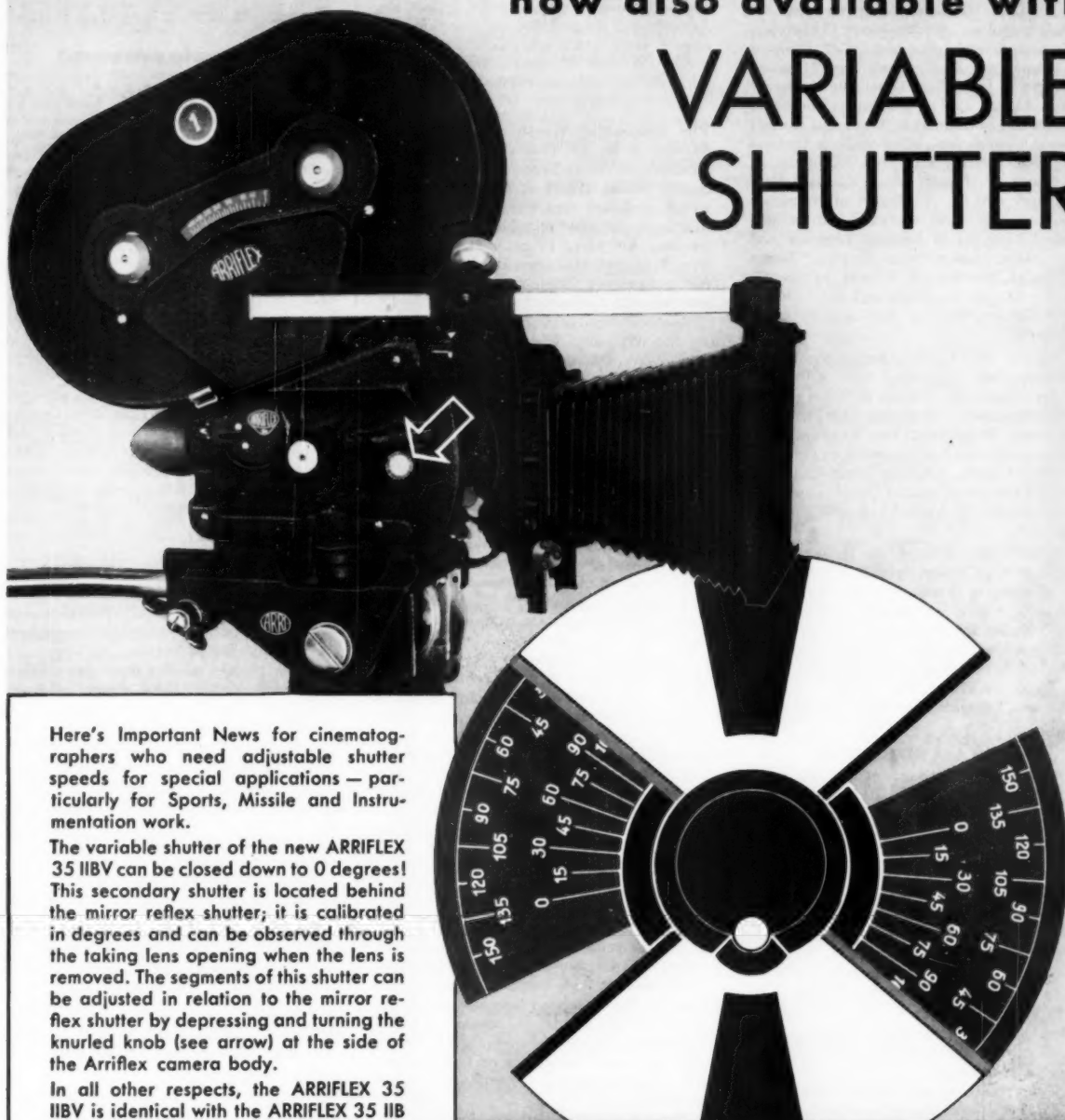
Circle 6-0130

Worldwide Organization

ARRIFLEX® 35

now also available with

VARIABLE SHUTTER



Here's Important News for cinematographers who need adjustable shutter speeds for special applications — particularly for Sports, Missile and Instrumentation work.

The variable shutter of the new ARRIFLEX 35 IIBV can be closed down to 0 degrees! This secondary shutter is located behind the mirror reflex shutter; it is calibrated in degrees and can be observed through the taking lens opening when the lens is removed. The segments of this shutter can be adjusted in relation to the mirror reflex shutter by depressing and turning the knurled knob (see arrow) at the side of the Arriflex camera body.

In all other respects, the ARRIFLEX 35 IIBV is identical with the ARRIFLEX 35 IIB which will continue as the mainstay of the line.



For Sale, Rent or Lease through your
Franchised Arriflex Dealer

ARRIFLEX®

Division of

KLING

PHOTO CORPORATION

257 FOURTH AVENUE, NEW YORK 10, N. Y.

The Chicago Section, at its February 9 meeting, had an audience of 59 to hear a series of papers describing "The Application of Motion Pictures to Medical Teaching and Research."

Three prominent men in the medical profession interestingly described the bringing together of medical research, motion pictures and specialized equipment design to accomplish remarkable advances in their respective fields. George Shambaugh, Jr., M.D., Chairman, Department of Otolaryngology, Northwestern University Medical School, discussed "Cell Division in Relation to Research on Hearing, Surgery of Inner Ear, Details By Camera." Paul Moor, Ph.D., Director, Laryngeal Research Laboratory, William and Harriet Gould Foundation, Northwestern University, discussed "Hi-Speed Analysis of Function of Human Vocal Cords." Paul Holinger, M.D., Professor of Broncho-Esophagology, University of Illinois, discussed "Studies of Human Bronchii and Esophagus, Motion Picture Studies." James Brubaker, Northbrook, Illinois, Moderator of the Discussion, explained the "Design and Construction of Ear and Bronchii Camera."

Mervin W. LaRue, Sr., Merwin W. LaRue, Inc., Chicago, and Ralph P. Greer, Associate Director, Division of Communication, American Medical Association, introduced the speakers. The Chicago Section has expressed its gratitude to Mr. LaRue, Sr., distinguished proponent of the use of motion pictures for medical research, for his help in arranging this program.

Prior to the meeting, the speakers were guests of the Chicago Section at a dinner in the Gibraltar Room of the Prudential Building, which was attended by twenty-eight. Following the meeting, there was a coffee session arranged through the courtesy of Wilding Picture Productions of Chicago.—William H. Smith, *Secretary-Treasurer*, Lakeside Laboratory, Gary, Ind.

The Chicago Section, at its March 3 meeting, featured two papers on "Visual Aids Production" and attracted a capacity audience of 88 to the Section's Prudential Building meeting room.

In answer to the requests of many Chicago Section members who were unable to attend the Fall Convention, the entire meeting was devoted to two excellent papers presented there by Norman R. Salmons, Manager, Audio Visual Service, Sales Service Division, Eastman Kodak Co., Rochester, N.Y.

Mr. Salmons' first paper, "Visual Aids Production," described some of the methods used in producing relatively low-cost visual aids for business and industry. Both art work and still photography were discussed, and excellent examples were given showing the preparation and proper utilization of each of these types of materials.

In his second paper, the author presented a suggested mode of operation and an outline for plant, personnel and equipment requirements necessary for the production of the visual aids previously described.

The suggested techniques applied to an in-plant photographic department within

industry and emphasized the inclusion of the person making the ultimate presentation as a vital part of the planning "team." Many of the examples given were the result of Mr. Salmons' personal experiences and demonstrated the practicability of such an approach.

Between papers, Film and Recording Services hosted the coffee and coke session which has become a welcome part of each of our section meetings. Members and speakers enjoy the opportunity to talk informally and we find that our question and answer periods are correspondingly more lively.—William H. Smith, *Secretary-Treasurer*, Lakeside Laboratory, Gary, Ind.

The Dallas-Fort Worth Section met on March 18 at the Dallas Public Library Auditorium. An audience of 45 heard a discussion of the career of Robert Flaherty, which included descriptions of his film-making techniques and his philosophy of cinema, by Mrs. Frances H. Flaherty. Mrs. Flaherty's talk was illustrated by perfectly preserved film clips of "Nanook of the North," "Moana," "Man of Aran," and other trend-setting documentaries.—P. W. Wygant, *Secretary-Treasurer*, 6021 Plants Ave., Dallas 12, Texas.

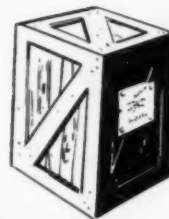
The New York Section, on April 29, in cooperation with the National Television Film Council, held the concluding phase of the two-part program "Operation Video Film—Better Films For Television," at the television studios of the American Broadcasting System in New York City. Scenes shot during the Section's March meeting were shown over closed-circuit television to an audience of 270 at two sessions.

A black-and-white print of eight scenes from a 35mm duplicate negative was telecast. These particular scenes were selected to demonstrate various factors in relation to the limitations of the brightness range of the television system. John Stott of Eastman Kodak Co., Chairman of the Panel in charge of the presentation, summarized the previous photographic session. Peter Keane, Screen Gems, outlined the suggested density requirements for film in television and E. Hamilton, ABC-TV, discussed the generation of the television signal and the use of the waveform monitor in relation to film density.

By means of superimposing the waveform monitor and the film scene on the television monitor, the audience was able to see the relationship of film densities to "black-and-white reference" of the television system. The brightness readings on the set, the density recommendation for television prints, and correlation of these items with the television waveform monitor were thoroughly explained on both a-c and d-c coupled monitors, simulating home reception.

Paul Kaufman, Du Art Laboratories, described the sensitometry of the film duplication process used to obtain the final print quality. He also showed the sensitometric and pictorial differences between a print from a good and a poor duplicate negative.

A discussion period followed each of the two sessions.—Edward M. Warnecke, *Secretary-Treasurer*, Eastman Kodak Co., 342 Madison Ave., New York, N.Y.



new products (and developments)

.....
Further information about these items can be obtained direct from the addresses given: As in the case of technical papers, the Society is not responsible for manufacturers' statements, and publication of these items does not constitute endorsement of the products or services.

The RCA TV Tape Recorder has been announced as in production. Six prototypes have been operated for about a year by NBC network and one was installed at WBTV, Charlotte, N.C. The Recorder is designed for black-and-white and color. Programming features include variable-speed cuing control, cue recording channel and master erase head. Built-in devices for ease of operation include picture and waveform monitor, monitor and CRO switches and servo control track monitoring. Other features include electronic headwheel adjustment, wideband demodulator and magnetic tone wheel.

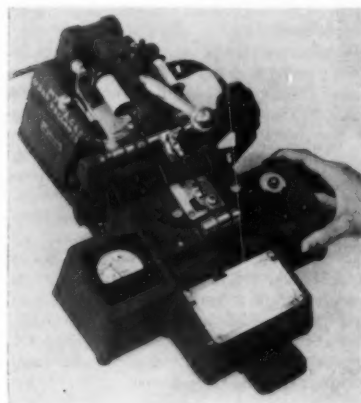
Ampex Corporation's new model Videotape (TM Ampex Corp.) Television Recorder, VR-1000B, was announced in early May for deliveries in June. To improve picture quality three innovations have been made: (1) tape start in 2 sec compared with the former 5 sec, to improve "on air" program cuing; (2) automatic brake release, to facilitate threading and splicing; and (3) tape playback speed control for momentary speed-up or slow-down to permit two recorders to be lip-synchronized or to synchronize a VR-1000B with an external audio recorder. Seven changes to simplify maintenance and set-up procedures are: (1) addition of head-life indicator; (2) high-power tube metering, to check high-power tubes at 38 points; (3) controls made more accessible; (4) improved switcher and demodulator design; (5) protective circuits, with a white light indicating location of trouble; (6) a pointer behind each control knob added to show original dial setting; (7) components more accessible by a swing-out harness.

The return of William H. Moenter to the Electronics Dept. of S.O.S. Cinema Supply Corp., 602 W. 52 St., New York 19, has been announced. Mr. Moenter is a picture and sound recording specialist with 25 years of electronics service experience. His duties in his present post will include checking and servicing theater equipment, sound systems and recording and electronic equipment.



An 8/16mm Automatic Hot Film Splicer with an adjustable motor-driven rotary cutter for automatic removal of emulsion is a product of Western Cine Service Inc., 114 E. 8th Ave., Denver, Colo. After the film has been locked in the platens, a pushbutton activates the cutter which travels the full width of the film and removes the emulsion to exactly the proper depth. This automatic feature makes the splicer especially suited for darkroom use. Other features include adjustable splice width, dual film registration pins centered on the platens to permit splicing of sound stock with perforations either toward or away from the operator, and constant platen temperature of 99 F to 101 F. The splicer was described on the Papers Program of the Society's Convention at Miami Beach.

Poly-Pak, a plastic package design for Minit Fix, a rapid fixer for both paper and film, has been announced by L. B. Russell Chemicals Inc., 14-33 31st Ave., Long Island City, N.Y. With the new packaging a 5-gal container can be sold at the same price as four 1-gal bottles. The 5-gal package occupies approximately half the space required to store four 1-gal bottles.



A splicer designed specifically for the instrument tape used in vertical-scale instrumentation has been developed by Prestosol Mfg. Corp., 3727 33d St., Long Island City, L.I., N.Y., in cooperation with Bendix Eclipse-Pioneer Div., and General Plastics Corp., manufacturers of nylon-coated, glass fiber instrument tape. The splicer is reported to measure, cut and seal the tape in endless loops within precise length tolerances of $\pm 1/1000$ in. Ends of the multilayered tape are

spliced in $2\frac{1}{2}$ sec by application of pressure and temperature. The machine, called the Presto-Splicer, is said to be the only butt-weld splicer that can fuse tape or film back to its original condition, end to end.

The design of the tape package in the instrument consists of two endless tapes, one inside the other. These tapes, driven by individual sprockets, run over idlers while in the viewing area. The inner tape shows the numerals which appear in the windows of the outer tape. The outer tape is graduated. The difference in length between the tapes, combined with the numerical arrangement, causes an indexing action to occur which cannot be seen by the pilot. Any slight deviation from the prescribed length of the tapes would cause inaccurate instrument readings, therefore the utmost precision is necessary in the splicing operation.

The Tel-Amatic 16/35 Negative/Positive Cleaning Machine is a product of S.O.S. Cinema Supply Corp., 602 W. 52 St., New York 19. A 3000-ft supply reel is fed into a wet area where it is jet-sprayed with solvent circulated by a pump-filter-motor assembly. Before leaving the wet area, the film passes between air squeegees and the cleaning solvent returns to a storage reservoir at the bottom of the compartment. After leaving the wet area, the film passes between two nylon velvet buffers and a capstan-type drive provides the traction to move the film rapidly through the unit. A slip clutch and microswitch triggered by release of film tension automatically halt the supply reel when it is empty and act as a safety device if a splice should part. The machine is 22 in. wide, 24 in. deep and 72 in. high, and weighs 480 lb. The entire film-cleaning operation is reported as taking less than 6 min for 1000 ft of film.



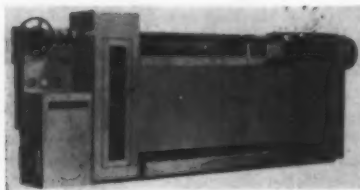
Scratches on Film Irritate Audiences

Scratches are havens for dirt, and refract light improperly. On the screen, they mar the picture and may distract attention. If on the sound track, they produce offensive crackling.

Fortunately scratches can almost always be removed — without loss of light, density, color quality, or sharpness.

Write for brochure

PEERLESS
FILM PROCESSING CORPORATION
165 WEST 46th STREET, NEW YORK 36, NEW YORK
959 SEWARD STREET, HOLLYWOOD 38, CALIF.



The Model AC-8, a 16mm Anscochrome/Ektachrome daylight film processor, has been announced by Filmline Corp., Milford, Conn. The machine processes 16mm Anscochrome reversal film at a speed of 480 ft/hr, or Ektachrome at 1380 ft/hr. Features include variable-speed drive and film speed indicator, overdrive film transport system, "temp-guard" system to provide automatic controls for refrigeration to the two developer solutions, and a two-stage heat control for forced warm air film drying. Approximate dimensions are 11½ ft long, 55 in. high, and 40 in. wide. Weight is 3000 lb. It is priced at \$12,700. Also available is Model AC-16, with a speed of 960 ft/hr for Anscochrome or 2400 ft/hr for Ektachrome, priced at \$21,400.

An instrument called a simultaneous converting automatic densitometer, used to obtain analytical color densities of films by optical-electronic means has been developed by Eastman Kodak Co. for more rapid testing of color films. The machine has not been made available commercially. It was described by Harold Holland, of Eastman Kodak's film testing division, during the annual meeting of the Optical Society of America on October 9, 1958, in Detroit. Main advantage of the new machine is that it eliminates storage and hand computation. This is made possible by feeding three simultaneous integral density values to an analogue computer that calculates the analytical densities immediately and records them in graphic form.

The Jaro-Salford Professional Exposure Meter has been announced by Rank Precision Industries Ltd., 37-41 Mortimer St., London W.1. The instrument, which measures either incident or reflected light, was developed by Salford Electrical Instruments Ltd. for the J. Arthur Rank Organization. The instrument comprises a selenium cell coupled to a microammeter which is calibrated logarithmically from 0 to 200 ft-c. The cell and meter are contained in separate housings for convenience in use. Two hoods make the instrument adaptable to different light ranges and to readings by incident or by reflected light. An exposure calculator is used for the latter. To adapt to either type of reading, the meter has a detachable hood which has on one side a honeycomb which restricts the effective angle to that of the average camera lens, and on the other side, an opal window. The hood may be fitted in either direction over the light-sensitive cell, so that the honeycomb may be used for brightness readings and the opal window for intensity readings.

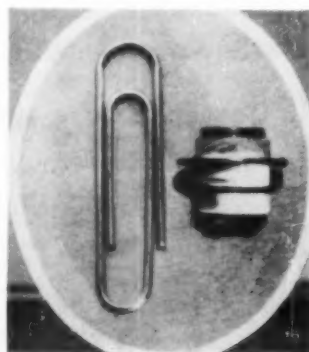
The meter is made in two sections, connected by an interchangeable bayonet catch. It is assembled either with the light receptor and the dial on the same side, or on opposite sides. The two halves of the instrument may be used at a distance and connected by a cable. The range may be extended to 2000 or 20,000 ft-c or ft-L by means of a "range change" hood. The meter is said to be extremely accurate, having a tolerance of $\pm 12\frac{1}{2}\%$, or 1/6 stop.

Thimble-sized electron tubes, expected to have important applications in miniature radio transmitters of space satellites and guided missiles were among developments demonstrated by Radio Corp. of America at the National Convention of the Institute of Radio Engineers held in New York, March 23-27. Named Nuvistor tubes, the minute tubes, now in an advanced stage of development, are based on a revolutionary new design concept. In the demonstration, the tubes were shown operating under conditions of severe shock, in an electric furnace at 660 F and in liquid nitrogen at -320 F.

Also exhibited was the newly developed diode-triode transistor. The device consists of a triode unit and alloy-junction diode unit in a single case.

To demonstrate the capabilities of developmental thermoelectric junctions, an experimental brushless and commutatorless motor was shown in operation. This motor is activated by a hydrogen-oxygen flame that heats a series of thermoelectric junctions positioned on a drum. Electrical current from the individual junctions is fed into the individual armature coils of the motor. The current in these coils crosses the magnetic field maintained by permanent magnets, thereby producing the force which causes rotation of the armature.

Other highlights of the exhibit included a developmental microminiature timing chain consisting of five micro-modules. Reputed to be the smallest unit of its type, the entire assembly is less than 2½ in. in length and about ½ in. high. It consists of a 192-k oscillator, a clipper, a pulse sharper, an output amplifier, and a multivibrator with two binary dividers.



A miniature electronic tube called the GE 7077, a product of General Electric Co., transmitted radio messages from the Pioneer IV, the Army's solar satellite, over a distance of 400,000 miles. An 18-ft parabolic antenna equipped with a

parametric amplifier, located on the roof of the company's Research Laboratory, tracked the Pioneer IV and recorded its transmissions.

The American National Exhibition in Moscow, which opens in July, will be highlighted by a color TV demonstration by the Radio Corp. of America. The exhibit will feature a fully-equipped color TV studio which will originate eight hours of live and film programs daily. The program will be carried by closed circuit to 16 TV receivers situated throughout the fair grounds in Sokolniki Park. Programing will be under the direction of a production crew from the National Broadcasting Co. The Soviet government announced recently that it would begin color TV broadcasting later this year.



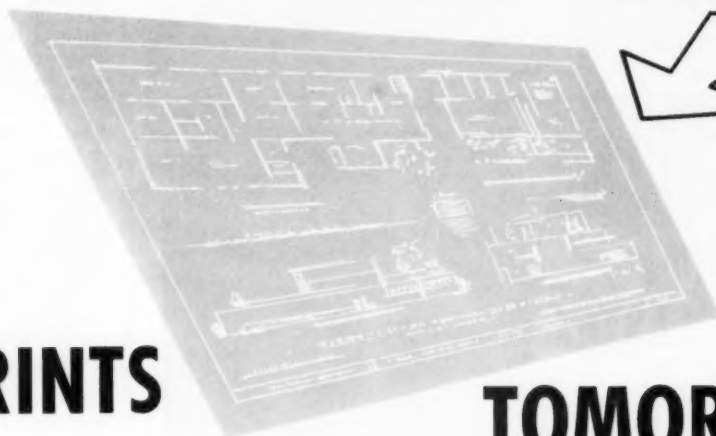
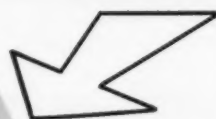
The Tele-Tran System, a battery-powered 4-lb television camera and 12-lb transmitter capable of transmitting live TV pictures over distances up to a half-mile has been announced by Dage Television Div., Thompson Ramo Wooldridge Inc., Michigan City, Ind. Demonstrated at the World Congress of Flight held in Las Vegas, Nev., April 12-19, the system is designed mainly for military applications where easily portable equipment for transmitting picture information from front lines or remote locations to headquarters without the use of cables or heavy power supplies is desirable. Other suggested applications include traffic control, crime detection and coverage of news events. Automatic operation is accomplished by electronic control, including automatic light level compensation by the camera.

A tropospheric - scatter - communications system developed for the Air Force by M.I.T.'s Lincoln Laboratory, Lexington, Mass., and General Electric's Technical Products Dept. has been tested at domestic sites over a 640-mile distance between Millstone Hill, near Boston, Mass., and Sauratown Mountain, near Winston Salem, N.C. The system comprises antennas, giant reflectors, powerful transmitters, specially-designed receivers and exciters, and a maze of filtering pipes. Although the new system is designed

DU ART



TRI ART



BLUEPRINTS

TOMORROW



THE ULTIMATE IN SCREENING FACILITIES

New 60 seat theater and separate conference room
with 16mm projection.

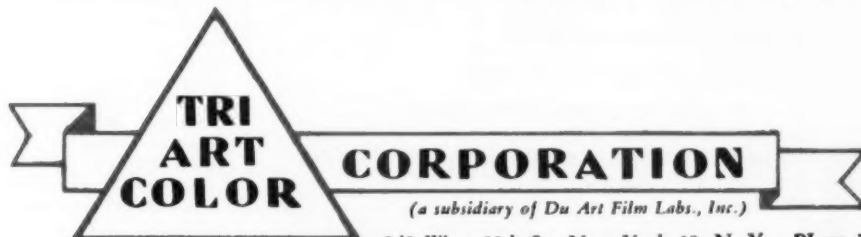


FIRST JET SPRAY COLOR PROCESSOR



TWO NEW FLOORS OF CUTTING ROOMS
AND OFFICES

ALL AVAILABLE IN EARLY SUMMER!



245 West 55th St., New York 19, N. Y. • PLaza 7-4580

IN CANADA: ASSOCIATED SCREEN INDUSTRIES, Ltd. • 2000 Northcliff Avenue, Montreal, Canada

primarily for voice and teletype communications it may also be of interest in the development of transoceanic television by the over-the-horizon means of transmission.

World-wide television, relayed across the ocean by means of satellite stations; and thin-screen television panels were among developments predicted by Elmer W. Engstrom, Senior Executive Vice-President of Radio Corp. of America, at a combined meeting of the Electric Institute and the Advertising Club of Boston held Feb. 11. These and other "remarkable advances" will be based upon "expansion of our power facilities and upon the wedding of many electrical and electronic

techniques..." Dr. Engstrom said. In discussing the thin-screen TV display panel he reported: "Electroluminescence is ready for specialized applications."

A vidicon measuring 5½ in. in overall length has been announced by the Industrial Tube Products Dept., Radio Corp. of America, Harrison, N.J. The design utilizes nonmagnetic parts in the front end, an optically flat faceplate and an envelope without a side tip. The tube is said to provide good color translation, color uniformity and balance when used in 3-vidicon color cameras.

A camera tube that can "see" in the dark and a compact transistorized color

TV pickup system developed by the Radio Corp. of America were among specially developed medical television equipments demonstrated at a conference on television uses in medical education held at the National Institutes of Health, Bethesda, Md., early in March. The conference was sponsored by the American Academy of General Practice and the Institute for the Advancement of Medical Communications Inc. The demonstration included a color film recording of the retina of the human eye. A wide-space image orthicon was used to permit a light level low enough to avoid disturbing the patient. Camera for the miniature pickup system weighs about 20 lb. It employs developmental half-inch vidicon tubes to pick up color images of subjects under a light microscope for display on standard color TV receivers.

A seven-channel closed-circuit television system has been installed by the U.S. Army Signal School, Fort Monmouth, N.J., and is used for instructing a student body of 6000 men. Radio Corp. of America cameras and equipment are used in the system, which is described as the "world's largest" in military use. A total of 468 receivers provide almost complete classroom coverage. Thirty-five monitors are located in the base hospital so that patients can keep up with their classmates. Big screen projectors in five central locations permit viewing of programs by larger audiences. The resources of the system permit the viewing of a single program by as many as 15,000 persons.

**ANOTHER
WOLLENSAK**

FIRST!

**Presenting
NEW 16 mm FASTAX
with
NEW High-Index Glass
2-Sided Prism**

Another fine camera is added to the Wollensak FASTAX line, the WF-3T. This high-speed motion picture camera retains all of the fine reliable features of the time-tested FASTAX and incorporates a high index glass, 2-sided prism for greater camera efficiency. No other camera in the high speed field, with this speed range, has this feature.



Model WF-3T

Now only the WF-3T FASTAX delivers:

- ★ Overall sparkling picture quality
- ★ Higher resolution over the entire frame
- ★ More uniform frame density
- ★ 10% more frame height
- ★ 100 foot daylight loading
- ★ Faster, effective shutter speed
- ★ Speed range from 150 to 6,000 pps

Plus... viewfinder... timing light... cut-off switch

Write for complete information and prices,
Bulletin WF-3T.

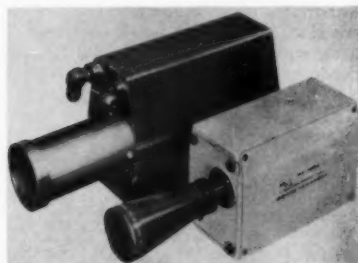
WOLLENSAK
OPTICAL COMPANY • ROCHESTER 21, N. Y.



A speed of one million frames/sec has been achieved with a camera developed at the California Institute of Technology for the Office of Naval Research. The inventor, Albert T. Ellis, has reported that a speed "several times faster" is possible. Developed to study on film the life history of cavitation bubbles, the camera has also been used to study explosions, high-frequency fatigue in aircraft metals and other materials, and stress and strain field propagation in metals.

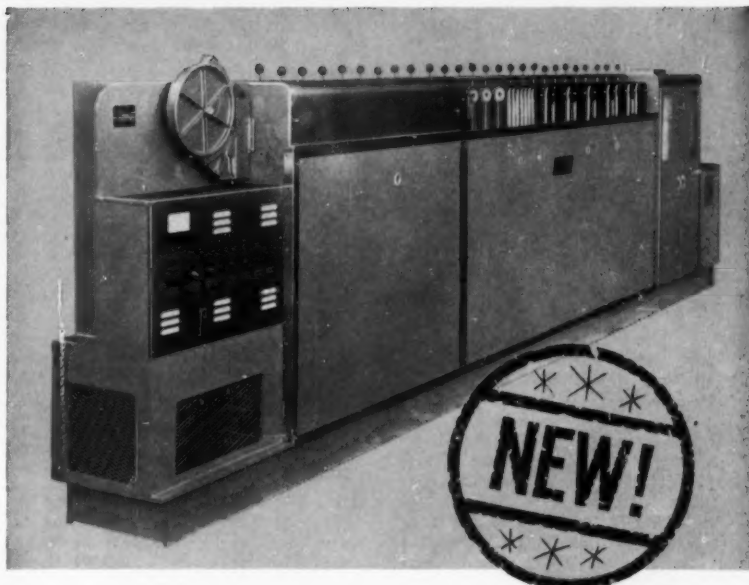
An extraordinary feature of the camera is that the film is stationary. It lies in a slot inside a drum (30 in. in diameter) and a spinning mirror records the images. This unusual device is necessary, otherwise the film would burn at the tremendous speed at which it would be moving.

The Kerr-cell shutter is capable of reacting at one-billionth of a second. The lens system employs two optical lenses for focusing and two polarized filters. Light "sliced" by one polarized filter reaches the Kerr cell where an electric potential of 19,000 v changes the direction of the "slices" so the light can slide through the second polarized filter. The current is applied in fast pulses by a vacuum tube, developed for radar. Between pulses there is no current and the light is stopped by the second polarized filter. The light images that get through the second filter then pass through the second optical lens which focuses it on the mirror in the film box. The mirror is attached to the motor of an air turbine from an airplane's refrigeration system which turns at the rate of 100,000 rpm. The camera uses ordinary 35mm film.



Qualitative data on shock vibration and temperature encountered near rocket nozzles during static firings at Edwards Air Force Base have been obtained by an adaptation of the HS-16WJ camera design of the Benson-Lehner Corp., 11930 W. Olympic Blvd., Los Angeles 64. Because of the high temperatures involved, a standard HS-16B High-Speed Photo Recorder was reduced in size and film capacity and inserted in a stainless-steel water jacket. A continuous flow of water surrounds the camera during the rocket firing, enabling it to withstand temperatures estimated at 5000 F and velocities in excess of mach 2. The lens is protected by a stainless-steel tube with safety plate glass in front. Standard features, such as correlation switches and footage counter, are incorporated.

A 35mm. Multidata Camera, Model IV-E, which is equipped with a data chamber which records auxiliary information directly onto the film, has been announced by Flight Research Inc., Box 1-F, Richmond, Va. The recording of the auxiliary data onto the film is accomplished through the use of split optics. The optical path, which transfers to the film the image of the data panel containing the instruments which supply the needed information, incorporates a front surface mirror, a short focal length lens, and a specially designed prism. The optical path passes behind the shutter so the data recording exposure is independent of "target" exposure. The readings on the auxiliary instruments in the data chamber are recorded along one side of the film in the same frame and at the same time as the target data. The auxiliary data area is $\frac{3}{16}$ in. wide by $\frac{1}{4}$ in. high in each picture for the target information.



HOUSTON FEARLESS COLOR LABMASTER

*Film processor for Ektachrome 7255
and Anscochrome*

Efficient, fully-automatic processing of 16mm Ektachrome 7255 or 16mm* Anscochrome reversal color films is accomplished with the new Houston Fearless Color Labmaster. Ease of operation is provided by the many automatic features. The Color Labmaster is a fine, precision-built machine, yet low in price... a result of Houston Fearless' 30 years of leadership in the manufacture of film processing equipment.

- Speed variable up to 30 f.p.m.
- Daylight operating. Dark room model available.
- All tanks stainless steel.
- Variable clutch-drive film transport prevents film breakage.
- All running-water washes.
- Accurate solution temperature controls.
- Double-headed rubber wipers.
- Air squeegee.
- Adjustable lifter rods.
- Filtered-air heat in dry box.
- Extra film magazines.
- Direct reading thermometers.

*16/35mm model also available



HOUSTON FEARLESS CORPORATION

11827 W. Olympic Blvd., Los Angeles 64, California

Send catalog and prices on:

() Color Labmaster processors. () B & W processors.
() Printers. () Camera heads. () Remote control
heads. () Tripods. () Dollies. () Pedestals.

Name _____

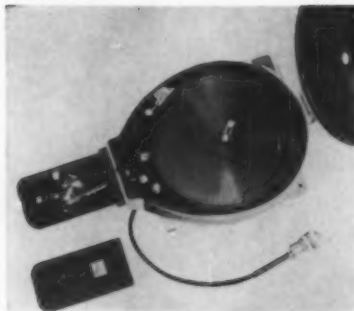
Firm _____

Address _____

City _____

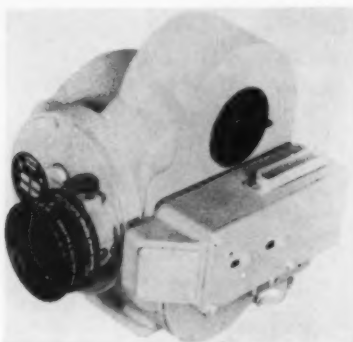
Zone _____

State _____



A film magazine designed to "throw" film to the camera "on demand" is capable of holding up to 800 ft of film. It is a product of Flight Research Inc., Box 1 F, Richmond, Va., and is constructed for use with the firm's Model III and III-B Multidata Cameras. Separate feed and take-up drive systems overcome problems of differing feed and take-up torque and speed, allowing the magazine to be used for single-frame or normal motion-picture operation at speeds up to 40 frames/sec. Removable-flange daylight loading reels are supplied with the magazine. Designed to withstand harsh environmental conditions, an internal thermostatically controlled heater may be used when low temperature operation is required. An automatic cutoff switch cuts off magazine and camera at the end of the film supply. Used with the Model III-B

camera it makes possible highly specialized airborne oscilloscope recording, studies of cloud formations and other photographic instrumentation.



The Digital Recorder, developed by Magnavox Research Laboratories for use on the 35mm Traid Fototracker camera and on the Bell & Howell Model 71 Eyemo cameras has been announced by Traid Corp., 17136 Ventura Blvd., Encino, Calif. The device provides a 96-bit matrix image on each frame and correlating coded data with pictorial records in real time. Comparable in size to a postage stamp, each recorder head uses two 48-lamp assemblies to form an array of 96 1-v lamps. A prism arrangement projects the matrix image onto film. The camera can

be operated at any frame rate up to 80 frames/sec. The recorder is shown incorporated in the camera door.

Improved Kodak films for aerial photography, including films that can be exposed under varying illumination levels without adjustments in camera exposure, were described in a paper by Raife G. Tarkington, of Kodak Research Laboratories, at the annual meeting of the American Society of Photogrammetry, March 8-11 in Washington, D.C. Recent gains in the manufacture of aerial film have led to materials in which the photographic speed varies markedly with the development time while the contrast changes very little, Mr. Tarkington reported. Aerial photographs can thus be taken under varying light conditions without changing the camera setting. Mr. Tarkington also discussed a new test criterion known as "sine-wave response" — a measure of image quality that is independent of the graininess of the film.



The Stereomat, an instrument to produce maps from aerial photographs, will be manufactured by Benson Lehner Corp., 11930 West Olympic Blvd., Los Angeles 64. The instrument, which performs automatic profiling and semi-automatic contouring, has been developed by Photographic Survey Corp. of Toronto, Canada. It is basically an automatic scanning correlator which can be mounted on conventional, projection-type plotters in place of manually-operated stereomechanisms. A cathode-ray tube replaces the usual platen. Vertical movements of the tube and leveling adjustments for the projectors are controlled by servo motors. The instrument traces correct contour lines by means of a complex array of electronic, optical and mechanical apparatus.

Anso Hyscan, a film with sensitivity to the color of light emitted by cathode-ray tubes, was described by J. B. Taylor of Anso at the annual convention of the Society of Photographic Scientists and Engineers, Oct. 6, 1958, in Rochester, N.Y. The film, which is used for airborne

STOP-MOTION PROJECTORS

*for Motion Picture
Analysis*

16mm and 35mm Models



Check these features!

- * single frame projection (still picture)
- frame by frame projection
- variable cine speeds
- forward or reverse
- remote control
- * no loss of picture brightness

L-W INDUSTRIALIST

*projectors are widely
used for Cine-Fluorography,
Engineering Time-Motion
Studies, Data Reduction,
Football Film Analysis.*

Ask for illustrated brochure

L-W PHOTO PRODUCTS CO.

P.O. BOX 147, NORTHRIDGE, CALIF.

in the East it's...

MOVIELAB

for

COLOR

EASTMAN COLOR

- DEVELOPING 35MM (5248) COLOR NEGATIVE
- DEVELOPING 35MM (5253) AND 16MM (7253) INTERMEDIATES
- 35MM ADDITIVE COLOR PRINTING
- 16MM CONTACT AND REDUCTION ADDITIVE COLOR PRINTING
- INTERNEGATIVES 16MM (7270) FROM 16MM KODACHROMES
- BLOW-UPS FROM 16MM KODACHROME TO 35MM COLOR
- KODACHROME SCENE TO SCENE COLOR BALANCED PRINTING
- 35MM COLOR FILM STRIP PRINTING



Write for Color Methods Brochure

MOVIELAB BUILDING • 619 W. 54th ST NEW YORK 19, N. Y. • JUDSON 6-0360

KINOPTIK
LENSES

THE ONLY COMPLETE SERIES
20 lenses from 5.7mm extreme wide-angle (113°) up to 500mm super-telephoto

OF PERFECTLY COLORMATCHED
All lenses have T-stops (as well as f-stops)

AND HIGH SPEED
Apertures from f/1.3, see below

APOCHROMATS



Exclusive 3-color correction, critical sharpness & highest contrast, even at full aperture.

FOR ANY 16mm, 35mm MOVIE AND TV CAMERA

C, Cine-Special, Arriflex, Cameraflex, Eyemo, Mitchell, barrelmounts, etc.

EACH HANDPICKED



Every lens is scrupulously bench tested on Kinoptik Collimator.

AND 100% GUARANTEED

Each Kinoptik APOCHROMAT carries an unconditional guarantee for finest mechanical precision and highest optical performance.

5.7mm f/1.8*	32mm f/1.9	75mm f/2
12.5mm f/2.5*	35mm f/2	100mm f/2
18.5mm f/2	40mm f/2.8	150mm f/2.5
20mm f/1.9*	40mm f/2	210mm f/2.8
25mm f/2	50mm f/2.8	300mm f/3.5
28mm f/2	50mm f/2	500mm f/5.6
32mm f/2.8	50mm f/1.3	

Collimator-Reflex w/275mm and 485mm lenses support

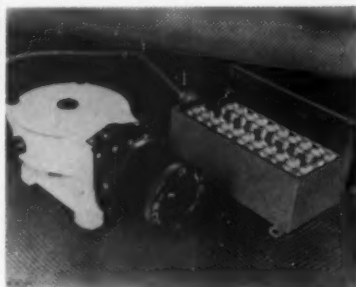
*for 16mm only

See your franchised KINOPTIK dealer or write for free illustrated brochure SMK-5



480 LEXINGTON AVE., NEW YORK 17 • YUkon 6-4920

rapid processing of radar recording film, is developed within 5 sec without stop bath or fix. Heated high-energy developer provides the developing speed. The film has a thinly coated, hard emulsion to accelerate developer penetration. The developer is squeezed off the film as it emerges from the bath. It is "self-limiting" and also contains organic materials to inhibit fog and stabilize the unfixed silver halide to light. Viewing equipment and specialized techniques employed in the rapid processing system were also described.



A wide-angle lens has been designed for missile scoring systems and manufactured by Pacific Optical Co., Inglewood, Calif., for Traid Corp., 17136 Ventura Blvd., Encino, Calif. Called the Traid 725, the lens has a speed of f/1.5 and a 110° field of view. It forms a round image of 0.297 in. diameter in the film frame and has a focal length of 0.1655 in. or 4.038 mm. A ruggedized GSAP mount, capable of withstanding accelerations as high as 50 g, is provided. The lens is shown mounted on a Traid 725 camera.

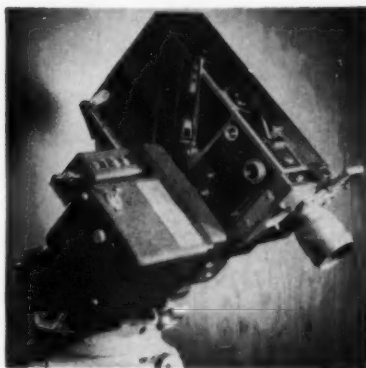


The Kinoflex Reflex Housing, an addition to the Kinoptik line of Apochromatic 16mm and 35mm lenses has been announced by Karl Heitz Inc., 480 Lexington Ave., New York 17. Designed to work with lenses of 210mm and longer focal lengths, the housing fits between camera and lens, replacing an equal section of the lens mount. Within the housing a movable prism is used for parallax-free focusing and framing the image and then removed to the viewfinder to allow all the light transmitted to reach the film. The viewfinder part is then used to frame and follow the subject. The unit is priced at \$299.00.

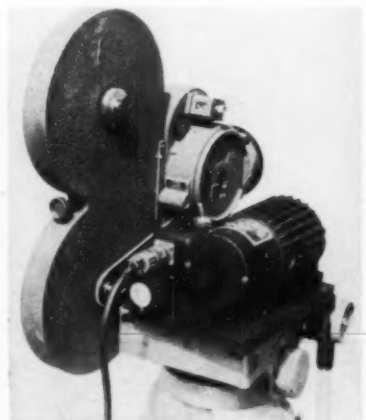
The Hyper-Gonar lens attachment for the Camex Reflex 8 is distributed in the United States by Karl Heitz Inc., 480 Lexington Ave., New York 17. The attachment can be used for both filming and projection. For filming it screws into the standard Camex 12.5mm lens to contract the image registered on the film. In projecting it is attached to the projection lens and turns 90° to expand the picture to a 2:1 wide-screen format. It is priced at \$129.00.

A camera drive unit and a time-lapse drive control are new products of Electro-Mechanical Development Co., 2337 Bissonnet, Houston 5, Tex. The camera drive, Model 1658, is made for use with Bolex H 16 cameras in the Emdeco time-lapse system. It is controlled by the timer, Model 785-T-2, or by Model 1643. An eight-conductor cable couples the drive unit to the timer which provides 120-v, 60-c power in pulses timed to operate the camera in a two-cycle system. The drive unit is energized to open the camera shutter until an exposure is made and is then re-energized to close the shutter.

The Model 785-T-2 timer has two time-lapse interval controls. A variable clock timer mechanism is used to select frame intervals between 0 and 60 sec. Other variable interval times are available upon special order.



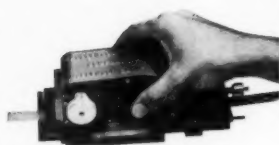
A CECO Stop Motion motor for the Cine-Kodak Special has been announced by Camera Equipment Co., 315 W. 43 St., New York 36. The new motor is equipped for 110 v a-c synchronous operation. It has a 1/2-sec exposure and can operate on both forward and reverse speeds. No special tools are required to mount it on the camera.



A motor kit for Bell & Howell 70 cameras which is designed to provide continuous or burst operation over runs of 400 ft, or more, has been developed by Traid Corp., 17136 Ventura Blvd., Encino, Calif. The new kit, called the Traid 72, has a four-speed, series-type governor controlled

NO FRAME LOSS

WITH HFC AUTOMATIC SPLICERS



\$195

35MM MODEL (AFS-35)

\$205

16MM MODEL (AFS-16)

FEATURES:

- Butt or overlap splices are possible.
- Knife blade precuts 2 frames of tape in 35MM size.
- Tape is rolled onto film automatically from a precision sprocket.
- The tape spool holds 66 ft. of either clear mylar tape (used for picture repair or splices for projection) or white mylar tape for use on magnetic film (clear tape can also be used for magnetic film). Colored mylar tape can be used in splicing film for developing machine passage.
- Registration pins assure perfect lineup of film.
- Stock units in 35MM are for Positive or Dubray Howell Perforated film. The 16MM unit will handle all standard 16MM motion picture film.
- Unit can be used on Dupont Cronar film or any other film base.

IMMEDIATE DELIVERY FROM STOCK NOW AVAILABLE



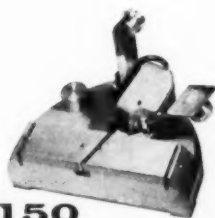
\$140

STRAIGHT

HFC TAPE SPLICERS

COMPACT LIGHT & DURABLE

HFC 16 & 35MM TAPE SPLICERS are compact units designed especially for butt splicing magnetic film with the aid of splicing tape. The 35MM models will also splice 17½MM film. Registration pins align the film. Non magnetic cutting blades remove the excess film evenly. The serrated compressors press the tape down and permit the operator to tear the tape easily. A non-pop splice results. IMMEDIATE DELIVERY FROM STOCK NOW AVAILABLE



\$150

DIAGONAL

MODELS AVAILABLE:

DIAGONAL CUT

35MM (TSD-1)
16MM (TSD-16)

STRAIGHT CUT

35MM (TS-1)
16MM (TS-16)
16MM (TS-16-4) w/4 pins

write for free brochure & catalogue

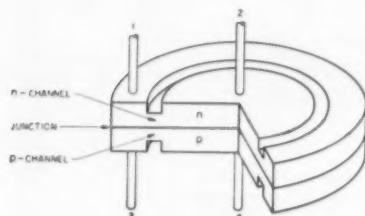


MAIN OFFICE: 956 SEWARD, HOLLYWOOD, CALIFORNIA, HO 2-3284

H F HOLLYWOOD FILM COMPANY • reels • cans • shipping cases

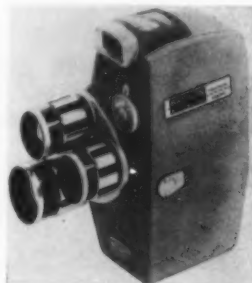
BRANCH: 524 WEST 43RD ST., NEW YORK, NEW YORK, LO 3-1546

motor, providing speeds of 16, 24, 32 and 64 frames/sec. Power requirements are 115 v a-c at 2 amp maximum or 28 v d-c at 6 amp maximum. Dimensions of camera and motor are $8\frac{1}{2}$ in. high, $8\frac{1}{4}$ in. wide and 10 $\frac{1}{2}$ in. long. The weight is 16 lb.



A four-terminal, semiconductor device called a field effect tetrode has been invented at Bell Telephone Laboratories. The device, of which laboratory models have been produced, can be made to function as a transformer, gyrator, isolator, non-distorting modulator, or a short-circuit stable negative resistance. The tetrode is composed of a disk of semiconductor with a diffused junction. A circular trench is cut and etched into each face of the disk, to within about 1 mil of the junction on either side. Two leads are then attached to each face, one inside the trench, the other outside. When a voltage is applied across the junction, the thickness of the depletion layer adjacent to it is increased or decreased, depending on the

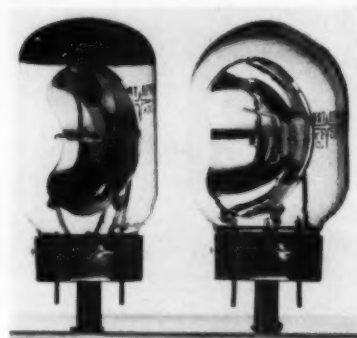
direction of the biasing voltage. This in turn increases or decreases the resistance of each "channel" between the bottom of the trench and the junction. Functionally, the device has no analog, either in electron tubes or in previous transistors.



The Baskon Electric Eight, an 8mm electric eye camera, was introduced by Baskon Corp., 291 S. La Cienega Blvd., Beverly Hills, Calif., at the Master Photo Dealers and Finishers Assn. Convention held in Philadelphia, March 22-26. This is the first camera announced by this company which, previously, has specialized in projectors. The company has also announced an 8mm projector weighing 9 lb described as "fastest loading." The camera features a three-lens turret, an electric voltmeter to indicate when the batteries are wearing out and a footage counter incorporated in the viewfinder. The camera is said to provide a continuous

run of over 1000 ft of film. It is priced at \$79.95. The projector is priced at \$44.95.

An electronic dimmer control announced by Century Lighting Inc., 521 W. 43 St., New York 36, has been installed in Yale Theatre, Yale University, New Haven, Conn. Described as "not a tube, not a magnetic amplifier," but a means of dimming large lamp loads electronically, features are reported to include instantaneous response, complete dimming to blackout and a significant reduction in size and weight. Each dimmer measures 6 by 6 by 6 in. and weighs 4 $\frac{1}{2}$ lb.



A horizontal-burning model of the Super Tru-Flector projection lamp designed for use in the optical system of an 8mm projector featuring an f/1.2 objective lens has been announced by Sylvania Electric Products Inc., 1740 Broadway, New York 19. Designated the T-14 model, the lamp was developed jointly by engineering groups of Sylvania and Bell & Howell Co. It is used in the Bell & Howell Lumina 1.2 8mm projector. The filament is mounted perpendicular to the base of the lamp to channel light through the lens with maximum efficiency. The lamp is 3 $\frac{1}{2}$ in. high.

The FloodFlash FF-33, a high-intensity flashbulb with a reported duration of 1.75 sec has been announced by Sylvania Electric Products Inc., 1740 Broadway, New York 19. Designed for high-speed applications, a 5 $\frac{1}{4}$ -in. flashbulb will expose about 37 ft of film at 1000 frames/sec or 75 ft at 2000 frames/sec. At slower camera speeds, several lamps may be flashed in sequence at 1.75 sec. It is priced at about \$2.35.

Three-dimensional effects are achieved by projection described as the "Wrap Around Motion Picture System" which has been developed by Jam Handy Organization Inc., 2821 E. Grand Blvd., Detroit 11. A 35mm projector is equipped with an extremely wide-angle lens which completely fills a hemispherical screen with the projected picture. The curve of the screen affords a horizon of 180° with a vertical scope of 90°. The system was introduced at the Detroit auto show and was also exhibited at the Chicago auto show. Viewers saw the "ultrarealistic" motion picture (a ride in a 1959 Chevrolet) in a theater consisting of a huge glass-fiber dome. The wide-angle lens was developed for use as a mili-

Filmline THE

ULTIMATE IN

FILM PROCESSING MACHINES

CONTROLLED

PROCESSING

FOR ALL BLACK & WHITE... AND COLOR EMULSIONS

FILMLINE CORPORATION, DEPT. SM-59, MILFORD, CONN.



**PORTRAIT
OF YOUR
STRONGEST
LINK!**

This dedicated chap is your own private genie, the sales-service representative assigned by General to cover the processing and handling of your film. He works for us but answers to you!

Whether it's technical data, production progress, job deadlines or prices about which you inquire, you need deal with only one person; we call him your account supervisor. His job is the linking of General's incomparable production facilities to your particular processing needs.

We're understandably proud of this unique service to our customers, and add it to an already imposing list of other outstanding "firsts," "bests," and "only-at-General-Film."

Whatever type of film you produce, be it educational, industrial, religious, governmental, etc., our background of experience is available to you; a letter or call will put us at your service.

OO GENERAL
FILM LABORATORIES CORP.
1548 ABEYLE, HOLLYWOOD 28, CALIF., HO 2-6171

Professional Services

BERTIL I. CARLSON

Photoproducts Co.
Consultants, designers, builders
in PHOTO INSTRUMENTATION
Color Processors • Cameras • Projectors
Box 60, Fort Lee, N. J.

COLORTRAN CONVERTER

LIGHTING EQUIPMENT
The most illumination for the least investment
CROSS COUNTRY RENTAL SYSTEM
ELIMINATES COSTLY SHIPPING
Send for Brochure "G"
NATURAL LIGHTING CORP.
612 W. Elk, Glendale 4, Calif.

J. A. MATTHEWS..... J. B. MINTER

Professional Sound Recording Services:
Disk Mastering, Tape Editing,
Dubbing etc.
COMPONENTS CORPORATION,
Recording Division
Denville, N.J. Oakwood 7-0290

TUFF COAT

Multiplies the useful life of all types of preprint
and release film. Protects from scratches and
abrasions. Safe, easy to use. Kills static, cleans
and lubricates. Special type available for
Videotape, Magstripe and Lacquered footage.
Send for Brochure "G"
NICHOLSON PRODUCTS CO.
3403 Cahuenga Blvd., Los Angeles 28, Calif.
Ho. 7-1712

CRITERION

FILM LABORATORIES, INC.
Complete laboratory facilities for 16
& 35mm black-and-white and color
33 West 60th St., New York 23, N. Y.
Phone: COLUMBUS 5-2180

PHOTOGRAPHIC

INSTRUMENTATION
Specializing in
HIGH-SPEED
Motion-Picture Photography
Photographic Analysis Company
100 Rock Hill Rd., Clifton, N. J.
Phone: PRESCOTT 8-6436

ELLIS W. D'ARCY & ASSOCIATES

Consulting and Development Engineers
Xenon-Arc Applications
Motion-Picture Projection
Magnetic Recording and Reproduction
Box 1103, Ogden Dunes, Gary, Ind.
Phone: Twin Oaks 5-4201

PROFESSIONAL MOTION PICTURE

PRODUCTION EQUIPMENT
Cameras, Sound Recording, Editing,
Laboratory and Affiliated Equip.
Consulting Services by Qualified Engineers
Domestic and Foreign
REEVES EQUIPMENT CORP.
10 E. 52nd St., NYC
Cable: REEVESQUIP

EAGLE FILM

LABORATORY, INC.
(Established 1951)
A 16MM SPECIALIST LABORATORY
341 E. Ohio St., Chicago 11, Ill.
WHitehall 4-2295

SUPPLIERS

PHOTOGRAPHIC CHEMICALS
and
Consultants in Photographic Chemistry
L. B. Russell Chemicals, Inc.
14-33 Thirty-First Avenue
Long Island City 6, New York
YELLOWSTONE 2-8500

16mm

Complete Color
and Black & White
Motion Picture
Laboratory Services
including
Sound Recording
FISCHER PHOTOGRAPHIC LABORATORY, INC.
6555 North Ave., Oak Park, Ill., EUclid 6-6603

FILM PRODUCTION EQUIP.

The world's largest source of supply for practically every need for producing, processing, recording and editing motion picture films.
Domestic and Foreign
S.O.S. CINEMA SUPPLY CORP.
Dept. TE, 602 W. 52 St., N.Y.C. - Cable: SOSOUND
Western Branch: 6331 Holly'd Blvd., Holly'd, Cal.

RENT

16mm, 35mm, 70mm
Motion Picture Cameras
High Speed Cameras
Special Cameras
Lenses
Lights
Processing Equipment
Editing Equipment
GORDON ENTERPRISES
5362 N. Cahuenga, North Hollywood, Calif.

ALL 16mm PRODUCERS SERVICES

Equip. Rentals • Technical Crews
40 X 70 Sound Stage
16mm LABORATORY FACILITIES
Exclusive TRIAD Color Control
Additive Color Print Process, Plus B & W
SOUTHWEST FILM CENTER
3024 Ft. Worth Ave., Dallas 11, Texas

ROCKY MOUNTAIN HEADQUARTERS

For 16mm Film Services
B&W and Anscochrome Processing
Printing—Recording—Editing
Production—Rental—Sales
All types of film in stock
Write for Price List
WESTERN CINE SERVICE, INC.
114 E. 8th Ave., Denver 3, Colo. AMherst 6-3061

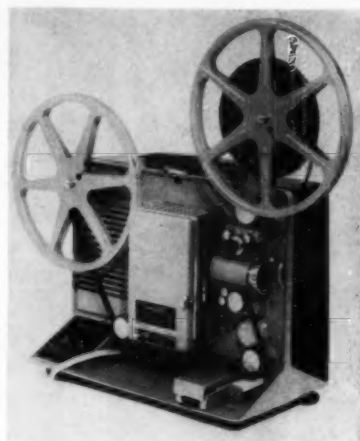
MITCHELL CAMERAS

Studio—Industry—Science—Research
16mm—35mm—65mm and Accessories
For Demonstrations Visit Our Showroom
and Offices
For Technical Information and Brochures Write
MITCHELL CAMERA OF NEW YORK, INC.
521 Fifth Ave., New York 17, N. Y. OXford 7-0227

Professional cards available to members. 12 insertions, 2x1 in., \$60

tary training device in simulation of combat conditions. Use of the system in industrial applications is said to be feasible economically because it employs standard equipment and requires only one camera and one projector. The dome can be disassembled for shipment.

An 8mm projector, called the Lumina 1.2, which has an average screen lumen rating of 150, or more, has been introduced by Bell & Howell Co., 7100 McCormick Rd., Chicago 45. Features include automatic rewind, dial-controlled lens focusing, built-in film splicer, variable speeds from 14 to 24 frames/sec and a framing lever for control in forward or reverse. It is priced at \$159.95. The company has also announced improvements on its electric eye and meter equipped 8mm cameras including an easy-to-use film speed scale.



Two 8mm cameras and an 8mm projector have been introduced by Sylvania Electronic Products Inc. 1740 Broadway, New York 19. The Cinetronic M3 features electric-eye exposure control, turret-mounted 10mm, 25mm telephoto and 6.5mm wide-angle lenses. Dimensions are 7½ by 2½ by 4½ in. It will be available in August at a list price of \$149.95. The Match-Matic utilizes an LM3 exposure meter calibrated in simplified aperture value numbers 2 through 9. It will be available in June at a price of \$99.95. The M750 projector, shown above, which uses the Super Tru-Flector projection lamp, weighs less than 13 lb. Focal length of the lens varies from 15mm to 25mm. It will be available in May at a price of \$124.95.

The TP-400, a 16mm film projector for educational and industrial closed-circuit TV has been announced by Radio Corp. of America. It can be used in vidicon camera systems either by direct projection into the camera or via multiplexer. A multiplexer setup permits operation of two film projectors and one slide projector with a single camera. A switch is included for local or remote control, including motor start-and-stop and the projection lamp. The projector case contains an audio amplifier which can deliver 10 w of audio power. Film reels up to 2000-ft capacity are accepted by the projector.

The Type VCA-1 amplifier, a product of Adler Electronics Inc., One LeFevre Lane, New Rochelle, N.Y., is said to provide a minimum gain of 40 db on any VHF channel in the 54-88-mc frequency range. At Channel 6, the noise figure is 3 db. The amplifier also features 10,000-hr tubes for reliability and remote crystal-control monitoring. Housed in a weather-proof enclosure, the 12-lb unit may be pole-, rack- or chassis-mounted.



The Transmagnemite, a miniaturized, portable field recorder, has been announced by Amplifier Corp. of America, 398 Broadway, New York 13. Mechanical features include modular plug-in construction with components in a glass-fiber terminal board, high-speed rewind, adjustable alignment head mounting, high-inertia balanced orbital flywheel, balanced flyball governor, double barrelled Swiss steel spring motor, precision lapped Swiss-made worm gear system, transistorized record VU indicator, and sound-insulated and non-corrosive battery mounts. Electrical features announced are: ultra low noise in out stage, push-pull ultrasonic bias oscillator, direct-coupled three-stage sections, interlooped a-c, d-c feedback, tuned ultrasonic bias, high-Q trap, adjustable ultrasonic bias current, segmented circuit design and wide dynamic range input acceptance.

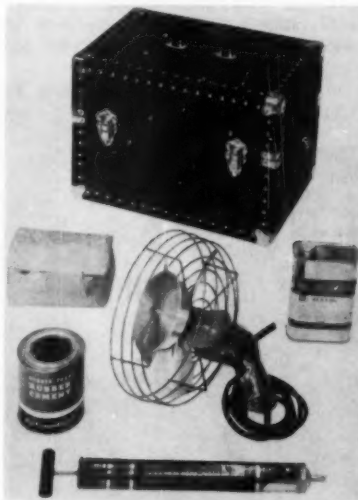
An antenna, has been built to specifications by Siemens-Halske of Munich for KPLR-TV, St. Louis, Channel 11. The transmission line consists of a cable almost 5 in. in diameter, having a copper core and protected by 60 bands of stainless steel. There are no splices or couplings between antenna and transmitter. The antenna does not require gas or fluid for dehydration, or any device for de-icing.

KPLR-TV, Channel 11, St. Louis, began broadcasting April 28. The station, owned by 220 Television Inc., of which Harold Koplar is President, has studios in the Chase and Park Plaza Hotels. Two Ampex Videotape units are installed. The specially designed Channel 11 antenna is a product of Siemens-Halske of Munich. James L. Caddigan, former Executive Vice-President and Program Director of Du Mont network, is Executive Vice-President and General Manager of the new station.

A revolutionary projection system developed by Bausch & Lomb for the elimination of "horizon sag" was used for the first time on October 15 for the world premiere of *The Roots of Heaven* in the New York RKO Palace Theatre. The system is considered still in the process of development. A technical paper by John D. Hayes of the B&L Scientific Bureau described the system on May 5 at the SMPTE Convention in Miami Beach.



A Perlux screen, 36 ft wide and 17 ft high, that can be varied in curvature, is a product of Andrew Smith Harkness Ltd., a company within the group of Rank Precision Industries Ltd., 37-41 Mortimer St., London, W1. The screen has been installed in Columbia Theatre, Shaftesbury Ave., London. For CinemaScope and wide-screen presentations, the depth of curve is 2 ft. This is adjustable through all ratios to a maximum of 6 ft for Todd-AO.

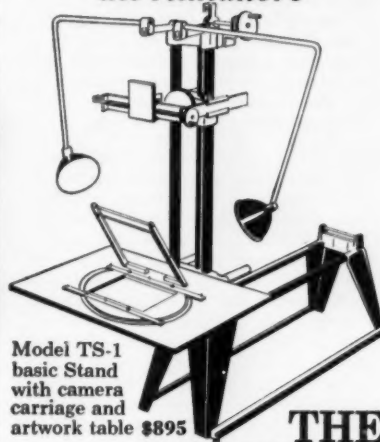


The Cobweb Spinner, first item in a new line of special effects equipment called Moleffects, has been introduced by Mole-Richardson Co., 937 N. Sycamore Ave., Hollywood 38. To spin cobwebs, the cup is filled with fluid, the cover screwed down, the machine pointed, the trigger switch pulled. A thin stream of fluid is blown out five to ten feet for placement as desired.

"High Intensity Arcs With Rotating Positive Carbons" is No. 6 in a series of booklets available from National Carbon Co., 30 East 42 St., New York 17.

A color photograph 80 ft long and 20 ft high, said to be the world's largest, has been made by Color Corp. of America, 43 W. 61 St., New York 23, and installed

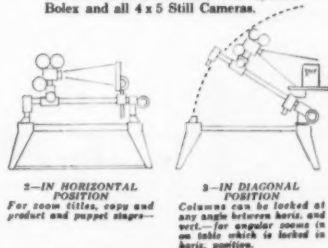
The first low-priced TRIPLE-DUTY animation, titlestand and product stage for all filmmakers



Model TS-1
basic Stand
with camera
carriage and
artwork table \$895

THE TRIPLEX

Florman & Babbb proudly introduces the all new TRIPLEX, a top quality precision designed animation stand. It's manufacture and workmanship assures you of the highest quality results. The F&B TRIPLEX costs less and does more than any other animation stand now available. It will accommodate Arriflex 16 or 35 mm., Eyemo, Maurer, Mitchell, Cine Special, Bolex and all 4 x 5 Still Cameras.



ADDITIONAL FEATURES

- Artwork table can be pivoted out of the way so huge artwork can be taped to wall or floor for copying.
- Smooth-stop motion zooms from three positions.
- Camera carriage compound movement, 11" North-South, 17" East-West.
- Camera zoom range to table—1 to 12 field to floor 1-24 field—
- Each movement driven by lead screw and hand-wheel—
- Each movement registered by counters in 1/100th of an inch.
- Diagonal or off-center zooms on both animation product stage.
- Animation table with 2 peg bars moving 16 registered with scale in 1/20th of an inch.
- Animation table rotates for spine and diagonal pans—registered in degrees.
- 9 x 12 hole through table top for rear lighting and rear projection.
- Platen is hinged—platen glass is gimbal mounted.
- Entire construction of steel and cast aluminum—resting on 4 adjustable leveling feet.

SPECIFICATIONS	
HEIGHT VERTICAL.....	74 INCHES
LENGTH HORIZONTAL.....	42 INCHES
WIDTH.....	38 INCHES
ARTWORK TABLE TOP.....	36" x 48"
WEIGHT.....	300 LBS. APPROX.
TS-2 COMPLETE STAND WITH COMPOUND CAMERA CARRIAGE, ROTARY PEG TRACK ANIMATION TABLE AND COUNTERS.....	\$1495.00
TS-3 RINGED PLATEN.....	\$80.00
TS-4 UNDERNEATH LIGHT BOX.....	\$85.00
TS-5 TOP LIGHTS ON UNIVERSAL BRACKETS.....	\$95.00

Write for complete descriptive brochure and price lists.

Complete stock of motion picture equipment, supplies, and F&B products.

FLORMAN & BABBB, INC.

68 W. 45th ST., N. Y. MU 2-2928

in the Cincinnati (Ohio) Music Hall. The wall-to-wall photographic mural is a view of Waikiki Beach in Hawaii and is intended to give the illusion of a picture window looking out on the beach. Enlarged with a specially designed condenser-type horizontal projection enlarger, the print was made in 27 strips mounted on 11 sections of $\frac{1}{2}$ -in. board with a total shipping weight of 4000 lb. The print has been coated with a special lacquer finish and sprayed with a fluorescence mixture to give the illusion of moonlight when viewed under Strobilite or black light.

Reactivation of Problems Subcommittee 2, Color Names, of the Inter-Society Color Council for the production of the colors representing the centroids of the 267 ISCC-NBS color-name blocks has been announced in the Council's *News Letter* for January. Subcommittee members are: Kenneth L. Kelly, Chairman; Deane B. Judd, and Miss Dorothy Nickerson. Plans are to publish a color chart to illustrate the *Dictionary of Color Names, Circular 553*. The 17 charts will be published in the form of a supplement to *Circular 553* and will be available for purchase separately until the present printing of the circular is exhausted. Subsequently, the charts will be bound with the circular. The sets consist of 6 by 10-in. glossy coated papers representing the centroid loci standards. A limited number of the charts are available at a price of \$500.00. Orders should be addressed to Norman Macbeth, Treasurer, Inter-Society Color Council, P.O. Box 950, Newburgh, N.Y.

An acceptance control chart developed at Eastman Kodak Co. to maintain high color print standards was described by Colby H. Chandler, Color Print and Processing Organization, Eastman Kodak Co., Rochester 4, N.Y., first at the Chemical Division Conference of the American Society for Quality Control, on Oct. 2, 1958, in Buffalo, N.Y., and later at a meeting of the Technical Association of the Pulp and Paper Industry. The new charts provide a record of the picture results of the process through plotting of actual physical values, Mr. Chandler said. They are an outgrowth of earlier Shewhart quality control charts, and apply in cases where average quality level variations are acceptable. The charts are designed to be particularly useful in applications such as batch operations, systems that operate intermittently, and continuous processes in which the raw materials are replenished in batches. An article by Richard Freund in *Industrial Quality Control* for October 1958 describes the charts and their use.

Traid Winds, published by Traid Corp., 17136 Ventura Blvd., Encino, Calif., contains in the March issue a section describing activities at the U.S. Naval Ordnance Test Station (NOTS), China Lake, Calif., and the "superb" technical facilities and equipments used in the laboratories. In the area of optical instrumentation "NOTS has occupied a prominent position in the development of optical instruments and techniques for

data acquisition since the early days of the Station . . . more than 120 people . . . do full-time work in the field of photography and . . . millions of feet of film records . . . are processed each year." Included in *Traid Winds* is a section on "News of the Technical Societies." Descriptions and specifications of equipments that may be purchased or rented from the company are given. Selected photographs and illustrations enhance the brief articles.

The Perma-New Scratch Removal System has been announced by Permafilm Inc., 723 Seventh Ave., New York 19. Reported advantages of the new system are that it does not grind down the celluloid and does not employ flammable lacquer or acetone in emulsion or base.

Altec Companies stockholders have agreed to exchange stock on a share-for-share basis for Ling Electronics stock, thus giving final approval to the merger of the two companies. Over 90% of the stockholders exchanged stock under an offer which expired April 17. Stockholders of Ling Electronics have been asked to approve a change of name to Ling-Altec with Altec companies operating as a subsidiary company. Plans have been announced for construction of new facilities on the Altec property in Anaheim, Calif., for research, development and manufacture of commercial and military equipment.

Expanded production facilities for prototype machined ferrites has been announced by Irvan Engineering Co., which recently moved from 13542 Ventura Blvd., Sherman Oaks, Calif., to 7933 Gloria Ave., Van Nuys, Calif. The firm has also added a special section for fast machining of prototype and experimental geometries.

Cinema Audio Frequency Equalizers, a 16-page catalog published by Cinema Engineering, a division of Aerovo Corp., Burbank, Calif., contains descriptions of equalizers, units and kits, and wave filters. Eight "case studies" are given, representing typical sound engineering problems with suggested solutions. The catalog is available from G. M. Smith 1100 Chestnut St., Burbank, Calif.

The Camera Selector, a four-page folder, illustrates and describes 27 different motion-picture and sequence-data cameras, and explains a plan whereby cameras and equipment may be rented by day, week or month. Eleven 16mm, nine 35mm, and seven 70mm cameras are described. The folder is available from Carlos Elmer, Traid Corp., 17136 Ventura Blvd., Encino, Calif.

A Directory and Buyers Guide for Electron Tubes is published by Metropolitan Supply Co., 1133 Broadway, New York 10. The directory lists most of the tubes made by American manufacturers. Receiving, television and special purpose tubes are listed by type number. The Directory is available without charge upon written request.



LIMIT AUDIO BAND WIDTHS...IMPROVE FIDELITY WITH THE ULTIMATE IN RECORDING FILTERS, THE StudioSound S-305...

A variable band pass filter that meets all requirements for restricting the frequency range in disc recording and similar applications. Generally used in dubbing and re-recording. Close spacing of cut-off frequencies at each end of the spectrum permits limitless choice of settings for optimum range.

Furnished on complete panel with separate in and out keys for each section. In and out jacks normaled to terminal strip in rear of assembly. CONTROLS: Low frequency—15 positions; "off" and cut-off frequencies from 30 to 200 cps. High frequency—15 positions; cut-off frequencies 2 to 15 kc and "off." "Off" positions provide flat response. Two key switches permit independent insertion of either filter in and out of the line.

For further information on this and other quality StudioSound components such as Filters, Pads, Networks, Etc. please inquire in person or write to:

STUDIO SUPPLY CO.

711 So. Victory Blvd. Burbank, California Box FW-5-59

AMPEX

World Leader in Precision Magnetic Tape Recording Instruments

Ampex Tape Recorders are in service throughout the world in television and radio stations, and in professional sound recording studios... wherever finest quality is required.



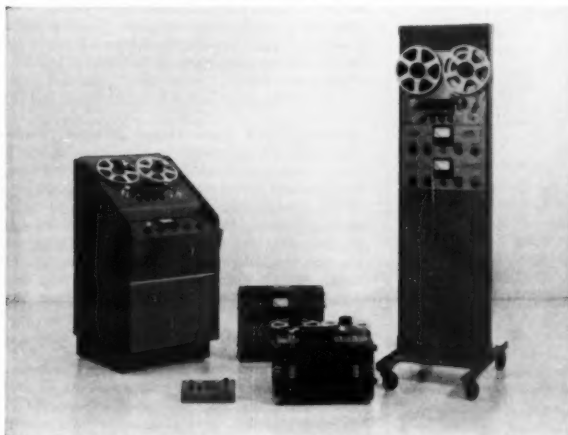
VR-1000 Videotape* Recorder

First commercially available Videotape Recorder. Magnetically records what the TV camera "sees," in either black and white or color. Playbacks look "live."



MODEL 300 Magnetic Tape Recorder

Standard of the professional recording industry, it consistently delivers the finest in audio reproduction. Available in as many as 8 channels, in console and rack mounting.



MODEL 351 Magnetic Tape Recorder

First choice of the broadcasting industry. Features printed circuits and miniature tubes. Available in console, rack and portable models, with one or two channels. Sold by dealers.



MODEL 3200 Magnetic Tape Duplicator

High speed duplication, with superb fidelity, of recorded master tapes. Makes up to 10 copies at one time. Available with one, two or four channel heads.

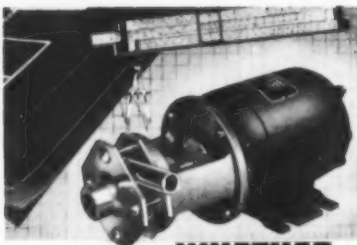
Fully illustrated brochures, complete with specifications, are available on each recorder and the duplicator. Technical bulletins are also available on the following subjects:
VIDEOTAPE RECORDING • VIDEOTAPE SPLICING • MULTI-CHANNEL RECORDING •
MULTI-CHANNEL TECHNIQUES • Write for the copies you want, today.

Tenth Year of Leadership

934 CHARTER STREET, REDWOOD CITY, CALIFORNIA

*TM Ampex Corporation





WHETHER YOU ARE PLANNING A NEW LAB... ...OR REPLACING A SINGLE UNIT

The same careful planning that goes into Fisher processing equipment is available to you in the form of a modern laboratory design service.

FISHER laboratory technicians carefully analyze the specific needs of your operation and follow through with sketches and recommendations that will enable you to produce more rapidly—at a lower cost without adding personnel to your staff.

Typical examples of Fisher design efficiency are: the compact, light weight centrifugal pump (pictured above) and the stainless steel processing sink (below).

No obligation on your part . . . costs you nothing for this service. Write today for the Fisher Job Layout Design questionnaire.

The Fisher line includes processing machines, processing sinks, tanks and trays, controls, regulators, mixers, washers, dryers and many other products that help to make photo processing a better more efficient industry.



Stainless steel sinks for every job on spacious heavy duty cabinets (sink body is removable) or on sturdy angle girder type legs. Sinks are welded by the continuous seam, Helarc method. Heavy type "316" stainless steel is fused to itself eliminating any electrolytic corrosive action. Other features include: Curve-clean corners, Die sumped drain outlet, Syphon drain, Adjustable leveling screws insulating undercoating. All sizes, length width and depth available. Prices on request.

OSCAR
FISHER
COMPANY, INC.
NEWBURGH, N.Y.



employment service

.....
These notices are published for the service of the membership and the field. They are inserted three months, at no charge to the member. The Society's address cannot be used for replies.

Positions Wanted

Motion-Picture Engineer. 25 yrs responsible positions in large organizations. Expert in all technical phases motion-picture laboratory color or B&W. 2 yrs as technical director and sales engineer for representative of well-known motion-picture equipment. Motion-picture consultant to U.S. Govt. agencies in Washington. Will accept responsible position supervising laboratory operations in management, quality control, install new laboratories, etc., or as technical sales representative for motion-picture equipment. Will consider most sections of U.S. or certain overseas assignments. Excellent knowledge of three languages. U.S. citizen. Write: E.C.C., First Floor, 219-47 74th Ave., Bayside 64, L.I., N.Y.

Cameraman. Desire position with progressive film-making organization. Have worked with most 16 and 35mm cameras using commercial color and B&W. Experienced in interior location, and set lighting, also editing, A&B roll cutting, sound recording, and process equipment. Free to travel. Resume available. H. LeRoy Mills, P.O. Box 245, Blacksburg, Va. Tel: Prescott 2-8261, Ext. 452.

Cinematographer-Editor. Desire position in educational film unit or commercial film company. Two years experience photographing and editing many educational films covering wide range of subjects. Writing and practical motion-picture laboratory experience. Age 23, married. B.A. degree in Speech and Television. Write Larry D. Filby, Box 70, Iowa City, Iowa.

Producer-Director-Writer — also production-coordinator. Early thirties. Unencumbered. Veteran. A1 health. College education. Multilingual. Best references. Produced, directed and written features, T.V. series, documentaries, industrial and educational shorts on five continents. Can operate still and movie cameras and own some professional equipment. Particularly well versed in foreign co-production problems. Recently returned from three-year stay in Latin America, now trying relocate. Wide personal and business connections throughout world. Have worked for U.N., Governments of U.S.A., U.K., Brazil, Netherlands, France, India, Australia, Ecuador. Fifteen years professional movie writing. Seek contract here or abroad. Write c/o PIDO, P.O. Box 816, Hollywood 28, California.

Motion-Picture Technician. Three yrs military and one yr civilian cinematography. B.S. degree in radio and television. Desire position within motion-picture or television realm. Prefer to locate Southern California area but will consider other locales. Write: Gerald L. Wiley, 136 Cedar Ave., Hershey, Pa.

Motion-Picture Career Engineer. Ten yrs in film labs on equipment design, B/M control,

procurement, floor plan and chemical layouts automatic controls, power supply, relay circuits' etc. Familiar color sensitometry, cameras printers, projectors. Currently working within the industry on product design. Available for non-routine "better" position in line with MIT degree in Engineering Administration. Will consider attractive location anywhere on permanent basis. Write care of Marshall W. Lynn, 49 West 24 St., New York 10.

Writer-Director. Experienced, imaginative, desires position with active motion-picture unit. Experience includes writing, directing and editing documentary films on agricultural and engineering subjects. 29, married, B.A. Penn State. Resume and samples available. Ted Kliman, 206 McDonald St., Blacksburg, Va. PR 2-8261, Ext. 452.

Director-Producer of business films and TV commercials in New York and Mexico City. 35, married, one child. 13 yrs experience in all phases film activity: writing, directing and producing, as well as handling clients and directing office details. Planning to return to U.S. April 30 after completing one yr assignment Mexico City reorganizing local film concern. Full command of Spanish, some Portuguese. Seek permanent position as director and/or production manager with film producer or advertising agency. Willing relocate anywhere in U.S. or Mexico. Have Mexican working papers. Write to: Frank J. Maguire, 35-45 78 St., Jackson Heights 72, N.Y.

Director-Cameraman, Editor of nontheatrical films. Experienced in all phases of production. Employed by Audio Visual Service USOM/L c/o American Embassy in Beirut, Lebanon as Program Advisor, Film Production Supervisor of 16 & 35mm Films. Now in U.S., wishes position with production company. Young (26), married, willing to relocate. Resume on request. Write: Hrayr Toukhanian, 305 Hyde St., San Francisco 9, Calif.

Motion-Picture Cameraman, Director, Technician. 13 yrs experience in photography, last 9 yrs in motion pictures with both 35 & 16mm on location and sound stage; lighting; film editing; directing; processing; customer relations; cost-time estimates; high-speed, micro and macro photography. Presently employed with large industrial firm. Desires position in motion-picture field. Age 27, married, willing to relocate. Resume on request. Write: William C. Mace, Jr., 308 Benham, Richland, Wash.

Industrial Photographer, Manager, Producer. Also experienced in lab management. Desires position with vigorous film production outfit in either production or organization. Will accept heavy project responsibility. Presently serving with U.S. Army Signal Corps as Chief, Motion Picture Branch, Signal Missile Support Agency, White Sands Missile Range. Prior service at Army Pictorial Center, New York, with chief duties to coordinate the maintenance, modification, design and installation of lab equipment. Thoroughly familiar with military photographic requirements. Experienced in all phases of motion-picture production. Single, willing to relocate. Military service ends July 31. Resume on request. Write: Lt. Avrum M. Fine, Navy BOQ, White Sands Missile Range, New Mexico.

Motion Picture Cameraman, Technician. 7 years actively engaged in 16mm motion-picture work. For the last 4 yrs have been employed as head of technical operations of a company producing films primarily for TV and educational usage. Experience includes work in practically every technical phase of motion-picture production. Desire connection with a producer of indus

Spotlight on



Gevapan 30

TYPE 165

Cine film

Gevapan 30, Type 165 is favored by experienced cameramen all over the world. This film gives uniform results, even when the shooting schedule calls for both interior and exterior shots. The fine grain and excellent gradation give extremely good definition with excellent tone rendition. The special sensitivity of this film also minimizes make-up and other photographic problems.

Negative films
Duplicating films
Sound recording films
Positive films
Reversal films
Gevacolor films
Magnetic film



Complete assortment of highest quality material

GEVAERT PHOTO-PRODUCTEN N.V. MORTSEL (ANTWERP) BELGIUM

In the U. S.: The Gevaert Company of America, Inc., 321 West 54 Street, New York 19

In Canada: Photo Importing Agencies Ltd., 345 Adelaide Street West, Toronto 2B, Ontario

News Columns

86th Convention Papers Program	340
Education, Industry News	340
Omission and Error	340
Obituary: P. A. McGuire	344
BOOKS REVIEWED	346
<i>Fundamentals of Electron Devices</i> , by Karl R. Spangenberg, reviewed by Harvey W. Mertz;	
<i>Photographic Sketch Book of the Civil War</i> , by Alexander Gardner; <i>Historical Costumes of</i>	

England From the Eleventh to the Twentieth Century, by Nancy Bradfield; *Progress in Photography 1955-1958*, D. A. Spencer, Editor-in-Chief; *British Broadcasting: A Bibliography (1958)*.

Translated Abstracts From Foreign Journals	349
Section Reports	354
New Products	356
Employment Service	372

Advertisers

Ampex Corp.	371
Berndt-Bach, Inc.	353
Camera Equipment Co.	341, 342
Camera Mart, Inc.	348
Comprehensive Service Corp.	349
Eclair	347
Electronic Applications, Inc.	346
Filmline Corp.	366
Fish-Schurman Corp.	350
Oscar Fisher Co.	372
Florman & Babb, Inc.	369
General Film Laboratories, Inc.	367
Gevaert Photo-Producten N.V.	374
Karl Heitz, Inc.	364
Hollywood Film Co.	365
Houston Fearless Corp.	361

Kling Photo Corp.	355
L-W Photo Products Co.	362
La Vezzi Machine Works	373
Magnasync Mfg. Co., Ltd.	351
MovieLab Color Corp.	363
Peerless Film Processing Corp.	357
Permafilm, Inc.	354
Professional Services	368
S.A.T.E.C.-Dyaloscope	343
SMPTE	352
Siemens & Halske AG	345
Studio Supply Co.	370
Tri Art Color Corp.	359
Wollensak Optical Co.	360

Meeting Calendar

AFCEA National Convention and Exhibit, June 3-5, Sheraton-Park Hotel, Washington, D.C.
 American Rocket Society, June 8-11, San Diego, Calif.
 Illuminating Engineering Society, Canadian Regional Meeting, June 11, 12, Chateau Laurier Hotel, Ottawa, Ont.
 ASME, Semiannual Meeting, June 14-18, St. Louis, Mo.
 American Society for Engineering Education, Annual Meeting, June 15-19, Carnegie Inst. of Tech. & Univ. of Pittsburgh, Pittsburgh, Pa.
 International Conference on Information Processing, June 15-20, UNESCO, Paris.
 International Commission on Illumination, 14th Congress, June 15-24, Brussels, Belgium.
 International Symposium on Circuit and Information Theory, June 16-18, Univ. of Calif., Los Angeles
 Engineering Progress Exposition, June 17-20, Hotel Commodore, New York.
 American Physical Society, June 18-20, Milwaukee, Wis.
 American Society for Testing Materials, Annual Meeting, June 21-26, Chalfont-Haddon Hall, Atlantic City, N.J.
 American Institute of Electrical Engineers, Summer General Meeting, Pacific General Meeting, Air Transportation Meeting, June 21-26, Seattle, Wash.
 Illuminating Engineering Society, Great Lakes Regional Meeting, June 22, 23, Statler Hotel, Buffalo, N.Y.
 Instrument Society of America, Nuclear Instrumentation Symposium, June 24-26, Idaho Falls, Idaho.
 Third National Convention on Military Electronics, June 29-July 1, Sheraton-Park Hotel, Washington, D.C.
 WESCON, Aug. 18-21, Cow Palace, San Francisco.
 Illuminating Engineering Society, Annual National Conference, Sept. 7-11, Fairmont & Mark Hopkins Hotels, San Francisco.
 American Institute of Electrical Engineers and National Electrical Manufacturers Association, National Electrical Insulation Conference, Sept. 9-11, Chicago, Ill.

Society of Plastics Industry, Midwest Section Conference, Sept. 10, 11, French Lick, Sheraton Hotel, French Lick, Ind.
 American Chemical Society, National Meeting, Sept. 13-18, Atlantic City, N.J.
 Standards Engineers Society, Annual Meeting, Sept. 21-23, Somerset Hotel, Boston, Mass.
 Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Sept. 21-25, International Amphitheatre, Chicago, Ill.
 IRE, Conference on Non-Linear Magnetics and Magnetic Amplifiers, Sept. 23-25, Shoreham Hotel, Washington D.C.
 National Symposium on Telemetry, Sept. 28-30, Civic Auditorium and Whitcomb Hotel, San Francisco.
 86th Semiannual Convention of the SMPTE including Equipment Exhibit, Oct. 5-9, Statler-Hilton Hotel, New York.
 IRE Canadian Convention, Oct. 7-9 Toronto, Ont.
 National Electronics Conference, Oct. 12-14, Hotel Sherman, Chicago.
 Society of Photographic Scientists and Engineers, Oct. 26-30, Edgewater Beach Hotel, Chicago.
 Sixth National Symposium on Reliability and Quality Control, Jan. 11-13, 1960, Statler-Hilton Hotel, Washington, D.C.
 IRE National Convention, Mar. 21-24, 1960, Coliseum and Waldorf-Astoria Hotel, New York.
 87th Semiannual Convention of the SMPTE, May 1-7, 1960, Ambassador Hotel, Los Angeles.
 88th Semiannual Convention of the SMPTE, and Fifth International High-Speed Congress and Equipment Exhibit, Oct. 16-22, 1960, Sheraton-Park Hotel, Washington, D.C.
 89th Semiannual Convention of the SMPTE, Spring, 1961, Royal York, Toronto.
 90th Semiannual Convention of the SMPTE, Oct. 15-20, 1961, New York.

SMPTE Officers and Committees: The rosters of the Officers of the Society, its Sections, Subsections and Chapters, and of the Committee Chairmen and Members were published in the April 1958 Journal, Part II.

sustaining members

of the Society
of Motion Picture
and Television Engineers

The objectives of the Society are:

- Advance in the theory and practice of engineering in motion pictures, television and the allied arts and sciences;
- Standardization of equipment and practices employed therein;
- Maintenance of high professional standing among its members;
- Guidance of students and the attainment of high standards of education;
- Dissemination of scientific knowledge by publication.

Progress toward the attainment of these objectives is greatly aided by the financial support provided by the member companies listed below.

Acme Film Laboratories, Inc.
Alexander Film Co.
Altec Service Company
Altec Lansing Corporation
Ampex Corporation
Animation Equipment Corp.
AnSCO
C. S. Ashcraft Mfg. Co.
The Association of Cinema
Laboratories, Inc.
Association of Professional Cinema
Equipment Dealers of New York
Camera Equipment Company, Inc.
The Camera Mart, Inc.
Florman & Babb, Inc.
National Cine Equipment, Inc.
S.O.S. Cinema Supply Corporation
Atlas Film Corporation
Audio Productions, Inc.
The Ballantyne Company
Bausch & Lomb Optical Co.
Bell & Howell Company
Berndt-Bach, Inc.
Burnett-Timken Research Laboratory
Byron Motion Pictures, Inc.
S. W. Caldwell Ltd.
The Calvin Company
Capital Film Laboratories, Inc.
Oscar F. Carlson Company
Century Lighting, Inc.
Century Projector Corporation
Cineffects, Inc.
Cinesound, Ltd.
Geo. W. Colburn Laboratory, Inc.
Color Reproduction Company
Color Service Company, Inc.
Columbia Broadcasting System, Inc.
CBS Television Network;
CBS Television Stations; CBS News;
CBS Film Sales; Terrytoons
Comprehensive Service Corporation
Consolidated Film Industries
Dage Television Division of Thompson
Ramo Wooldridge Inc.

Andre Debrie Mfg. Corp.
DeFrenes Company
DeLuxe Laboratories, Inc.
Desilu Productions, Inc.
Du Art Film Laboratories, Inc.
Dupont Company of Canada, Ltd.
E. I. du Pont de Nemours & Co., Inc.
Eastern Effects, Inc.
Eastman Kodak Company
Electronic Systems, Inc.
Elgeet Optical Company, Inc.
Max Factor & Co.
Filmline Corporation
General Electric Company
General Film Laboratories Corporation
General Precision Laboratory
Incorporated
W. J. German, Inc.
Gevaert Photo-Producten N. V.
Guffanti Film Laboratories, Inc.
The Harwald Co., Inc.
Frank Herrfeld Engineering Corp.
Hollywood Film Company
Hollywood Film Enterprises, Inc.
Houston Fearless Company
Hunt's Theatres
Hurley Screen Company
JM Developments, Inc.
The Jam Handy Organization, Inc.
Jamieson Film Co.
The Kalart Company, Inc.
Victor Animatograph Corporation
Kling Photo Corp. (ARRI Div.)
Kollmorgen Optical Corporation
Laboratoires Cinématographiques CTM,
S. A.
Lorraine Orlux Carbons
J. A. Maurer, Inc.
Precision Film Laboratories, Inc.
Mecca Film Laboratories, Inc.
Mitchell Camera Corporation
Mole-Richardson Co.

Motion Picture Association of America,
Inc.
Allied Artists Products, Inc.
Columbia Pictures Corporation
Loew's Inc.
Paramount Pictures Corporation
RKO Radio Pictures, Inc.
Twentieth Century-Fox Film Corp.
United Artists Corporation
Universal Pictures Company, Inc.
Warner Bros. Pictures, Inc.
Motion Picture Printing Equipment Co.
Movielab Film Laboratories, Inc.
Moviola Manufacturing Co.
National Carbon Company, A Division of
Union Carbide and Carbon Corporation
National Screen Service Corporation
National Theatre Supply Company
Northwest Sound Service, Inc.
Panavision Incorporated
Pathé Laboratories, Inc.
Warren Conrad Portman Company
Prestoseal Mfg. Corp.
Producers Service Co.
Rank Precision Industries Ltd.
Reid H. Ray Film Industries, Inc.
Reeves Sound Studios, Inc.
Charles Ross, Inc.
L. B. Russell Chemicals, Inc.
Ryder Sound Services, Inc.
Shelly Films Limited (Canada)
Southwest Film Laboratory, Inc.
The Strong Electric Company
Technicolor Corporation
Titra Film Laboratories, Inc.
Trans-Canada Films Ltd.
Tri Art Color Corporation
Van Praag Productions
Alexander F. Victor Enterprises, Inc.
Westinghouse Electric Corporation
Westrex Corporation
Wilding Picture Productions, Inc.
Wollensak Optical Company

The Society invites applications for Sustaining Membership from other interested companies. Information may be obtained from the Chairman of the Sustaining Membership Committee, Byron Roudabush, c/o Byron Motion Pictures, Inc., 1226 Wisconsin Ave., N.W., Washington 7, D.C.